
Microsoft Excel

Advanced Training Manual

March 2016

TresVista Financial Services Technical Training

This Book Belongs To:

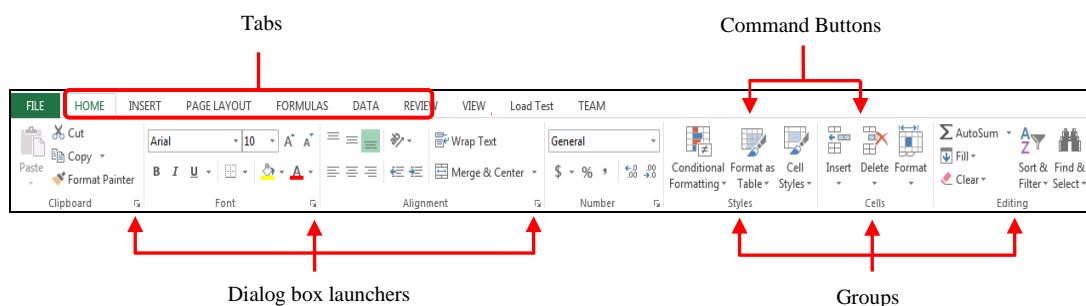
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Before We Begin

MS Excel 2013 is friendly to use as well as easy to navigate. It is strongly encouraged to use keyboard shortcuts to save time. (Keyboard shortcuts will be covered in last section.) Excel 2013 provides a great way to remember the shortcuts, lest we forget. Excel 2013 uses 'Ribbon', which makes it easy to navigate and find menus. The Ribbon shows you commonly used options needed to perform a particular task.

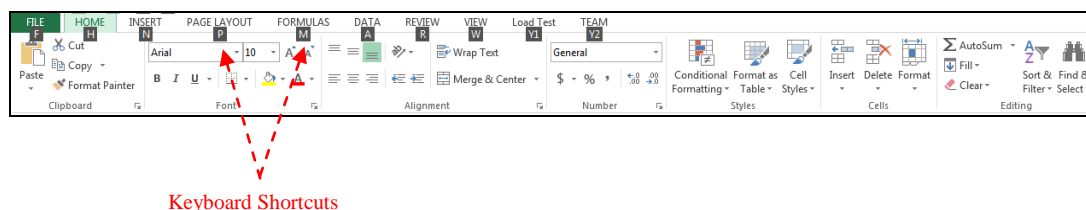
For example, look at the following ribbon (the top section of the excel window).



- I. **Tabs** for each of Excel's main tasks that bring together and display all the commands commonly needed to perform that core task.
- II. **Groups** that organize related command buttons into subtasks normally performed as part of the tab's larger core task.
- III. **Command buttons** within each group that you select to perform a particular action or to open a gallery from which you can click a particular thumbnail. *Note: Many command buttons on certain tabs of the Ribbon are organized into mini-toolbars with related settings.*
- IV. **Dialog box** launcher in the lower-right corner of certain groups that opens a dialog box containing a bunch of additional options you can select.

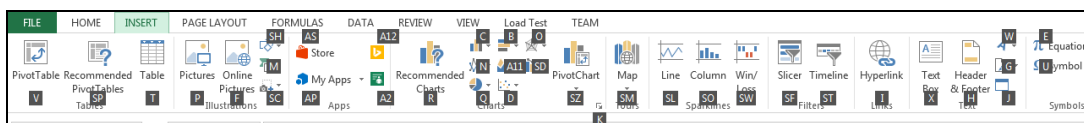
As seen above, we have the following Tabs such as Home, Insert, Page Layout, Formulas etc. which are similar to Excel 2010. Each of the tabs has Groups such as Font, Alignment, Number, Styles, Cells, etc. You can directly access the tab by pressing the ALT and the tab shortcut key in this case, **F**ile ("F"). Excel 2013 helps you to go to a particular tab by flashing a key on the particular tab or command buttons. So, in short you will be pressing the ALT and F key to access the file tab.

For example:



As soon as you press the ALT key, you will see several keys popping up corresponding to the tab. This means that as soon as you press the ALT key and the key which is flashed, the corresponding tab will open.

Take for example, you need to access the Insert tab. Press the ALT key along with the N key. The following is displayed.



You must have noticed that as soon as you press N, the Insert tab is displayed and that each command button will show the keys (shortcuts) corresponding to it. If you want to Insert a picture, you need to press P when you have access to the Insert tab. Finally, you can insert a picture.

To recap, if you want to insert a picture, you need to press **ALT+N+P**

The following is the content of the respective tabs.

- I. **Home tab** with the command buttons normally used when creating, formatting, and editing a spreadsheet, arranged into the Clipboard, Font, Alignment, Number, Styles, Cells, and Editing groups.
- II. **Insert tab** with the command buttons normally used when adding particular elements (including graphics, PivotTables, charts, hyperlinks, and headers and footers) to a spreadsheet, arranged into the Tables, Illustrations, Charts, Sparklines, Filter, Links, Text, and Symbols groups.
- III. **Page Layout** tab with the command buttons normally used when preparing a spreadsheet for printing or re-ordering graphics on the sheet, arranged into the Themes, Page Setup, Scale to Fit, Sheet Options, and Arrange groups.
- IV. **Formulas** tab with the command buttons normally used when adding formulas and functions to a spreadsheet or checking a worksheet for formula errors, arranged into the Function Library, Defined Names, Formula Auditing, and Calculation groups. Note: This tab also contains a Solutions group when you activate certain add-in programs, such as Analysis ToolPak and Euro Currency Tools
- V. **Data** tab with the command buttons normally used when importing, querying, outlining, and subtotaling the data placed into a worksheet's data list, arranged into the Get External Data, Connections, Sort & Filter, Data Tools, and Outline groups. Note: This tab also contains an Analysis group when you activate add-ins, such as Analysis ToolPak and Solver.
- VI. **Review** tab with the command buttons normally used when proofing, protecting, and marking up a spreadsheet for review by others, arranged into the Proofing, Language, Comments, and Changes groups. Note: This tab also contains an Ink group with a sole Start Inking button when you're running Office 2013 on a Tablet PC or a computer equipped with a digital ink tablet.
- VII. **View** tab with the command buttons normally used when changing the display of the Worksheet area and the data it contains, arranged into the Workbook Views, Show, Zoom, Window, and Macros groups.

Excel Formatting

Modeling Macros

Macro Name	Key Stroke	Result
FontColor	CTRL + SHIFT + "L"	Toggles: <input type="text" value="Text Color"/> <input type="text" value="Text Color"/> <input type="text" value="Text Color"/> <input type="text" value="Text Color"/> <input type="text" value="Text Color"/>
Justification	CTRL + SHIFT + "J"	Toggles: <input type="text" value="Alignment"/> <input type="text" value="Alignment"/> <input type="text" value="Alignment"/>
CellBorderToggle	CTRL + SHIFT + "B"	Toggles: <input type="text" value=""/>
Digits	CTRL + SHIFT + "D"	Toggles: <input type="text" value="12.3"/> <input type="text" value="\$12.3"/> <input type="text" value="\$12.34"/> <input type="text" value="1234.0%"/> <input type="text" value="12.3x"/> <input type="text" value="12.340"/>
CenterAcross	CTRL + SHIFT + "M"	<input type="text" value="Centers (or 'De-Centers') Text Across Selected Cells"/>
Highlight	CTRL + SHIFT + "H"	Toggles: <input type="text" value="Background Color"/> <input type="text" value="Background Color"/>
SpacerRow	CTRL + SHIFT + "T"	Toggles: Row Height = 13.5, Row Height = 5
SpacerColumn	CTRL + SHIFT + "Y"	Toggles: Column Width = 1, Column Width = 0.5, Column Width = 8.43
Gridlines	CTRL + SHIFT + "G"	Shows / Hides Gridlines
FreezePanels	CTRL + SHIFT + "F"	Freezes / Unfreezes Panels Around Selected Cell
Gray Border	CTRL + SHIFT + "R"	Adds Gray Lines Between Selected Cells
Blue Shading	CTRL + SHIFT + "K"	Toggles: <input type="text" value="Format 1"/> <input type="text" value="Format 2"/>
Heading	CTRL + SHIFT + "N"	<input type="text" value="Makes Cells Bold, Centered Across Selection, Adds a Single Accounting Underline and Adjusts Row Height"/>
Currency (Common)	CTRL + SHIFT + "C"	Toggles: <input type="text" value="\$"/> <input type="text" value="£"/> <input type="text" value="€"/> <input type="text" value="INR"/>
Currency (MENASA)	CTRL + SHIFT + "A"	Toggles: <input type="text" value="AED"/> <input type="text" value="BHD"/> <input type="text" value="EGP"/> <input type="text" value="JOD"/> <input type="text" value="KWD"/> <input type="text" value="OMR"/> <input type="text" value="PKR"/> <input type="text" value="SAR"/>

Excel Formatting Rules

1. Use a consistent color scheme (use print "black & white")
 - BLUE** = inputs (historicals, assumptions and drivers)
 - BLACK** = calculations and references on *same* schedule/sheet
 - GREEN** = references from another schedule/sheet
 - RED** = warnings to another user / links to another file

2. **DON'T** embed inputs in formulas:

✗

		2003	2004	2005	2006	2007	2008	2009	2010
Revenues		\$125.0	\$137.5	\$149.2	=F4*(1+0.08)		\$187.9	\$203.0	\$219.2

INSTEAD, break out into separate line items:

✓

		2003	2004	2005	2006	2007	2008	2009	2010
Revenues		\$125.0	\$137.5	\$149.2	=F4*(1+G\$6)		\$187.9	\$203.0	\$219.2
Revenue Growth Rate			10.0%	8.5%	8.0%	8.0%	8.0%	8.0%	8.0%

3. Never input the same number twice. Let Excel flow and be dynamic.
4. Enter exact figures – Excel will round for you according to format.

		Enter asand Excel will "round" according to the format.	
Cash		25.382	\$25.4	
Accounts receivable, net		215.032	215.0	

5. Do not hide rows or columns. Group, if necessary (*Data* menu, Group command)

	1	2	A	B	C	D	E
	1		With "Show Details"				
	2		SG&A as % of Sales				
	3		Other Operating Expenses #1 as % of Sales				
	4		Other Operating Expenses #2 as % of Sales				
	5		Other Operating Expenses #3 as % of Sales				
	6						
	7						

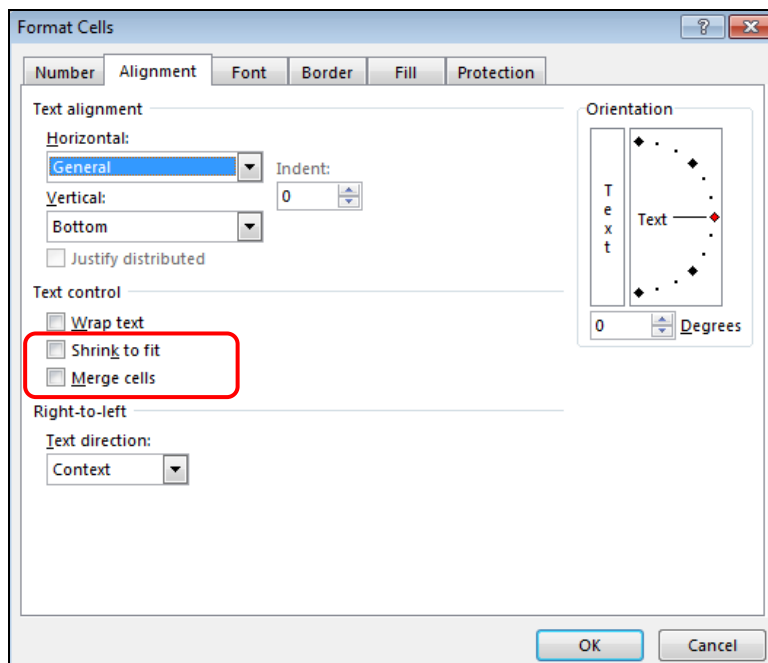
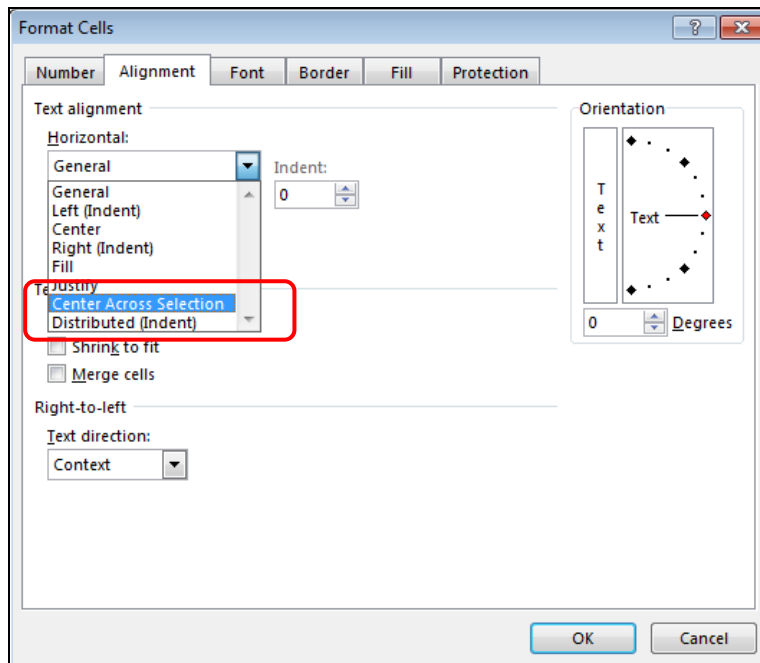
	1	2	A	B	C
	1		With "Show Details"		
	2		SG&A as % of Sales		
	6				
	7				

Merging Cells

1. **DON'T** Merge cells. Use Center across Selection instead.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										

- Access: Format Cells (**Ctrl+1**), Alignment tab
 - Choose Center Across Selection under Text Alignment-Horizontal
 - Make sure that the Merge Cells box is deselected (or unchecked)



Understanding Number Formatting

Consider the following code:

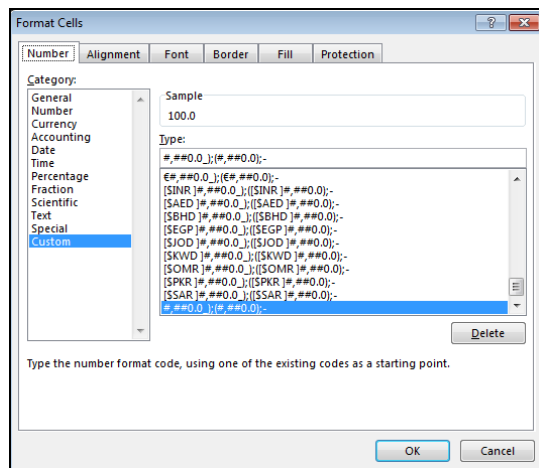
#,##0.0_);(,##0.0):-

Positive Separator Negative Zero

Note: The number formatting code can be accessed by Ctrl+1 (Format Cells), Number tab, Custom, and Type of formatting code.

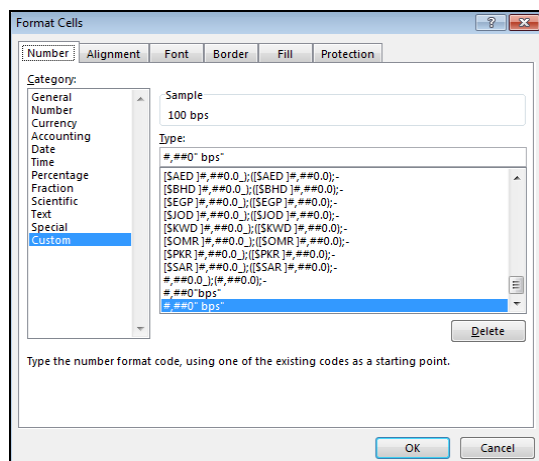
The above represents the following:

- #: shows a number if present
Leading with # prevents “0,034.7”
- 0: Shows numerals from zero through 9
- _(underscore): leaves a blank space as wide as the next character



The example above aligns the decimals of positive and negative figures due to the insertion of “_” in the positive number. Additionally, (the bracket) “(” towards the negative number indicates the negative number will be represented by “(and)” For ex. -3415 will be represented by (3,415.0).

If you want to merge a number with letters/words, simply insert “ ” and type the required characters between the “ ”. For example: If you want the cell to show “bps” at the end of every typed number, go Format Cells (Ctrl+1) and go to Custom. After the # (number formatting), insert bps enclosed in “ ”, i.e. “bps”



Note: If using more than one letter, put the letters in quotes.

Hiding the data with Number Formatting

If you don't want to see particular numbers for presentation purposes, you can hide the numbers/letters by simply typing the following:

- Double semi-colon (;;) "hides" a number
- (;;;) for text

You may ask then, we can simply do this by making the font color white. However, White font prints as BLACK when using "Print Black and White". Be sure to include a comment to identify the text.

Use of Text Function

A text function is used to place a numeric value into a phrase or sentence and allows you to use dynamic titles, phrases or footnotes.

= TEXT(value, format text)

- "value" = numeric value, a formula or a reference to a cell containing a numeric value
- "format text" = number format in text form from Category box on Number tab in Format Cells dialog box

Note: The text formula cannot be 'General format' or contain an asterisk ()*

= TEXT(5454, "\$#,##0.0")

This command will represent 5454 as 5,454.0.

"&" joins a TEXT function to a phrase (and vice versa)

Consider the following example:

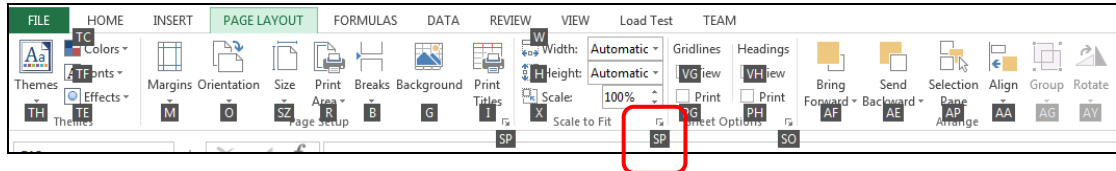
	A	B	C	D	E	F	G	H	I	J
1										
2										
3			Line Item		2014					
4			Gross Profit		10.0%					
5										
6		Text	The Gross Profit of the company in 2014 is 10.0%.							
7		Formula	= "The "&TEXT(C4,0)&" of the company in "&TEXT(E3,0)&" is "&TEXT(E4,"0.0%_")."							
8										

Page Setup

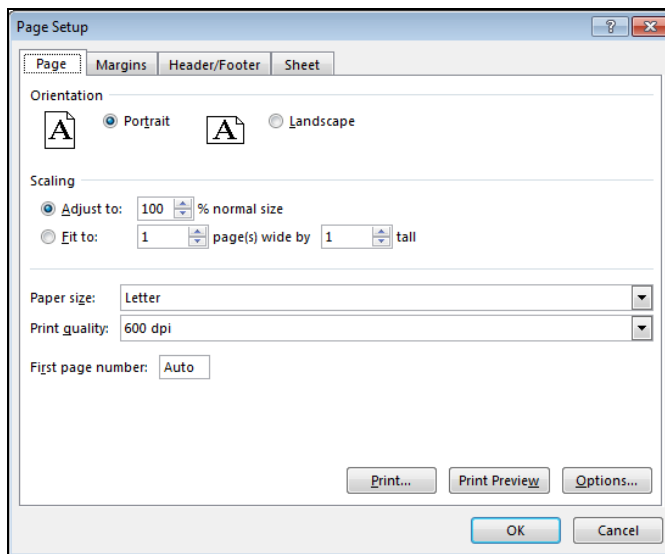
Keyboard shortcut: Alt+P+SP

To make your Excel sheet print ready, perform the following steps:

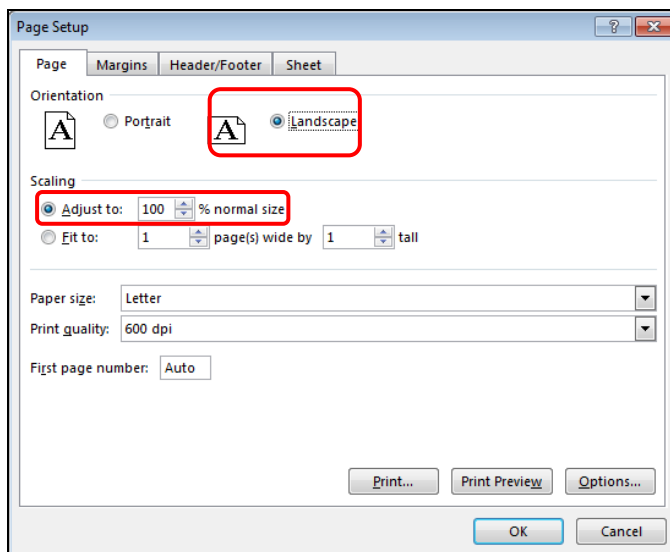
1. Access the Page Layout Tab by pressing (**Alt+P**).
2. Then under the Page Setup, go to Scale to Fit group (**Alt+P+SP**) and click on Dialog Box launchers.



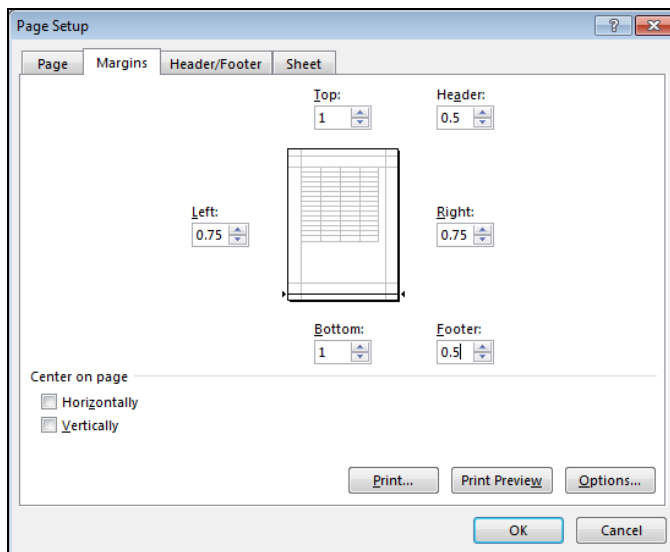
The following window will appear:



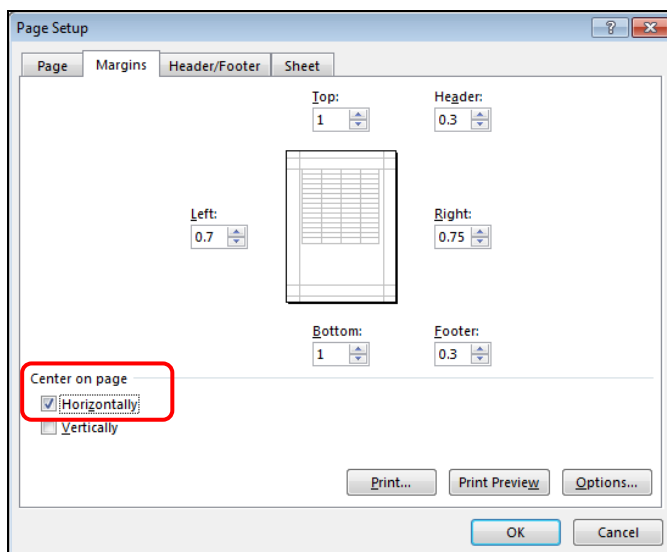
3. Check the Landscape radio button and click on Fit to One page or Adjust the print area depending on how you would like your sheet to be printed (In 2 pages, 3 pages etc.) In this example, we assume you will print the entire Excel sheet in one page. This can be reduced from 100% to lower if you need a larger area of excel to be printed on each page.



4. To allow margins to be placed in the printed sheet, toggle to the Margins tab.



5. Adjust the margins accordingly so that there's buffer around the page, and under the Center on Page group, check Horizontally.

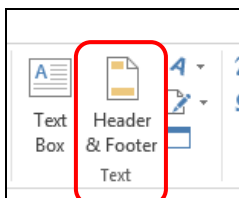


Header and Footer

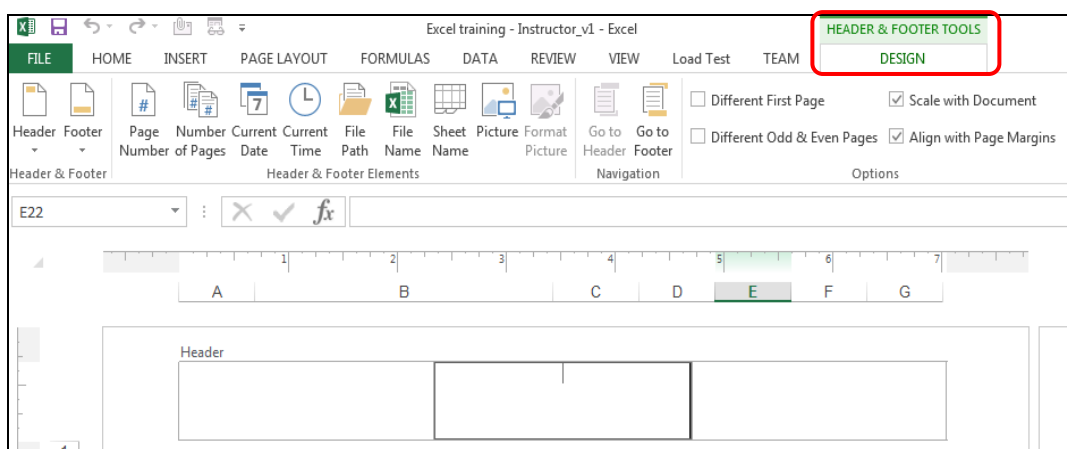
You can go to the Header/Footer tab directly in the previous window or perform the following steps:

Steps to insert a header:

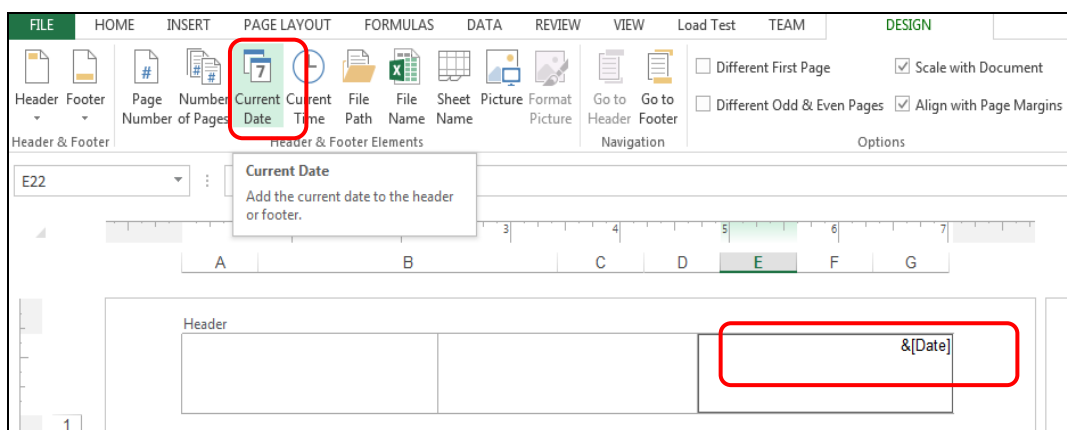
1. Go to Insert and go to Header & Footer under the Text tab (**ALT+N+H**)



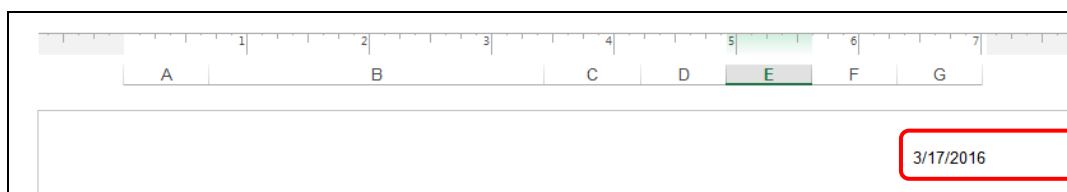
2. As you click Header & Footer, you will find the Header & Footer tools tab displayed.



3. Click on the area where you would like to insert contents in the Header / Footer. For example, consider we want to insert the current date on right hand side of the header.



4. The Date is finally inserted.

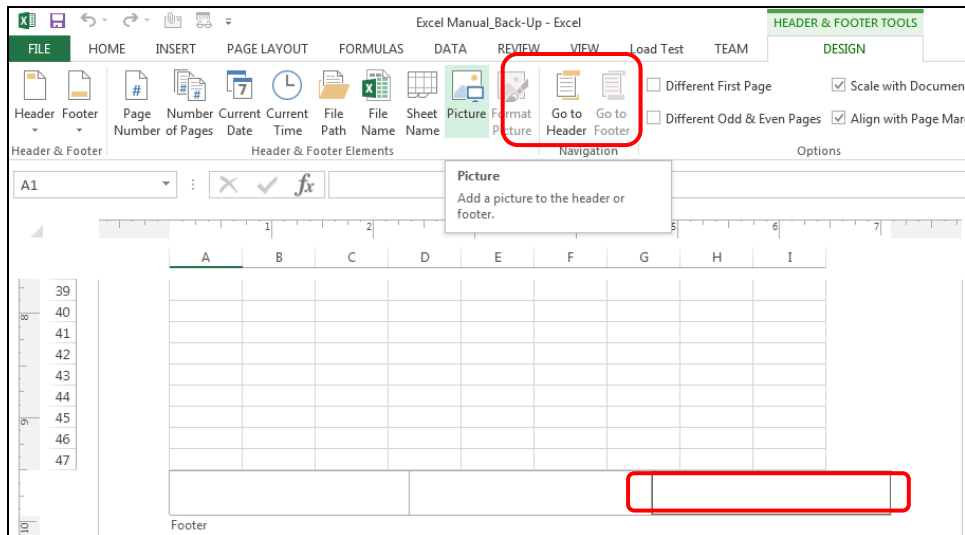


Steps to insert a Footer:

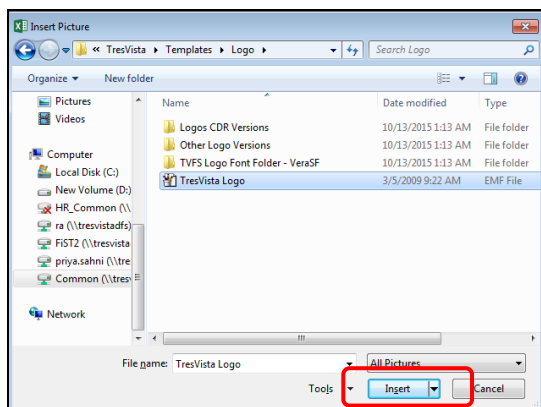
Now, in the footer, we need to insert the TresVista logo on the right hand side.

Follow the below steps:

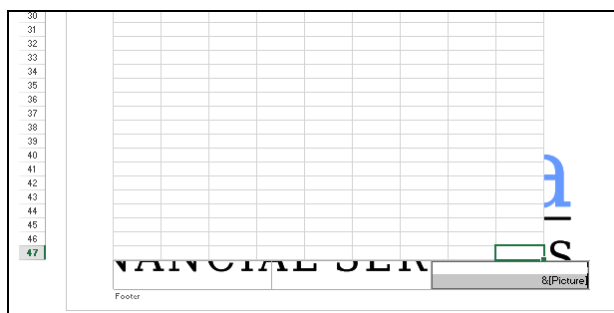
1. Click on the right hand side of the footer and click on Picture.



You will get the following window:

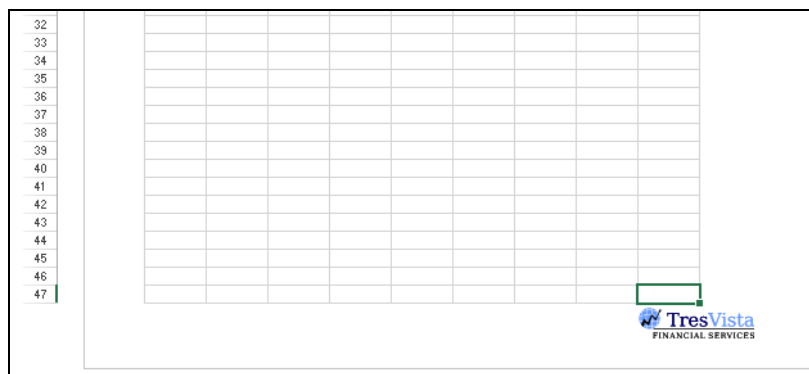
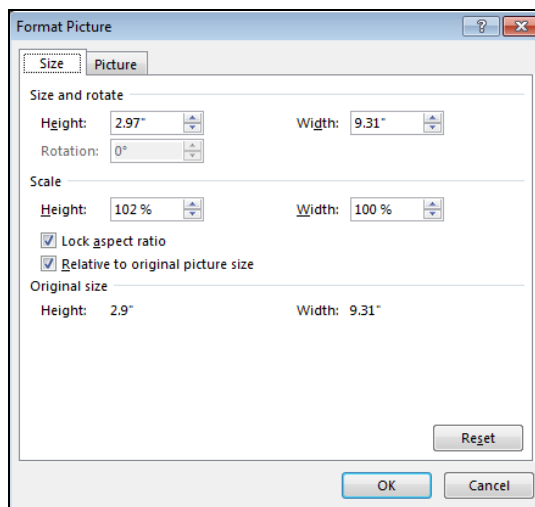


2. Select the File path where you have the target picture stored and click on Insert.
Your footer will now look like this.



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As you may have observed, the picture size is too big to fit as footer and hence, we need to resize to picture. You can edit the picture size by clicking the Format Picture command button (adjacent to Insert picture command button).



Repeating Rows and Columns

Consider the following example:

If you notice under the below pages, page 2 of the excel sheet doesn't have the header rows.

Page 1

Company	Country	Currency	21-01-11	Stock Price		% of 52	Beta	Diluted Shares	Market Capitalization	Cash & Equivalents	Total Debt	Net Debt	Minority Interest	Enterprise Value ⁽¹⁾	Total Assets	Total Shareholder's Equity
				High	Low											
Almarai Co Ltd	Saudi Arabia	SAR	93.75	117.00	81.25	80.1%	0.7	230,000	21,562.5	135.0	5,196.2	5,061.1	54.9	26,678.6	13,236.0	6,451.0
Savola	Saudi Arabia	SAR	26.60	36.70	21.55	72.5%	1.0	500,000	13,300.0	661.1	5,173.6	4,512.5	1,194.8	19,007.3	17,781.9	8,214.9
Danone	France	EUR	48.92	49.22	39.35	99.4%	0.7	647,922	31,696.3	2,165.0	9,475.0	7,310.0	47.0	39,053.3	28,099.0	11,987.0

Page 1 of 2

Page 2

China Mengniu Dairy Co Ltd	Hong Kong	CNY	24.85	26.45	19.52	94.0%	0.9	1,738,049	43,190.5	6,697.8	840.8	(5,857.0)	459.4	37,793.0	17,305.8	10,217.5
Dean Foods Co	United States	USD	10.16	17.00	7.13	59.8%	0.5	183,130	1,860.6	92.0	4,067.5	3,975.5	14.5	5,850.7	7,956.7	1,514.1
Morinaga Milk Industry Co Ltd	Japan	JPY	314.00	382.00	250.00	82.2%	0.6	253,977	79,748.8	20,789.0	100,989.0	80,200.0	1,533.0	161,481.8	370,024.0	111,753.0
Nestle Sa	Switzerland	CHF	53.85	56.90	48.92	94.6%	0.8	3,465,000	186,590.3	16,246.0	20,100.0	3,854.0	731.0	191,175.3	111,641.0	62,598.0
Juhayna Food Industries	Egypt	EGP	5.51	6.50	3.93	84.8%	0.9	726,416	4,002.6	723.9	761.4	37.5	0.3	4,040.4	2,728.2	1,643.4

Page 2 of 2

As you can see, it is difficult to identify the contents in page 2 due to absence of header rows. In order to add header rows, all you need to do is repeat the rows in the sheet, so that the same rows would be repeated in subsequent pages within the sheet.

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Toggle to the Sheet tab under Page Setup, select the row/columns to be repeated on all the pages for an Excel sheet.

Page Setup

Print area: A1:Z36

Print titles

Rows to repeat at top: \$1:\$6

Columns to repeat at left:

Print

☐ Gridlines

☐ Black and white

☐ Draft quality

☐ Row and column headings

Comments: (None)

Cell errors as: displayed

Page order

☒ Down, then over

☐ Over, then down

Print... Print Preview Options...

OK Cancel

Now, the printout of page 2 of this sheet will look like this.

Comparable Companies
(Source: Bloomberg)
(All figures are in Local currency unless otherwise stated)

Company	Country	Currency	Stock Price				Beta	Diluted Shares	Market Capitalization	Cash & Equivalents	Total Debt	Net Debt	Minority Interest	Enterprise Value ⁽¹⁾	Total Assets	Total Shareholder's Equity
			21-06-11	52-Week High	52-Week Low	% of 52 Week High										
China Mengniu Dairy Co Ltd	Hong Kong	CNY	24.85	26.45	19.52	94.0%	0.9	1,738,049	43,190.5	6,697.8	840.8	(5,857.0)	459.4	37,793.0	17,305.8	10,217.5
Dean Foods Co	United States	USD	10.16	17.00	7.13	59.8%	0.5	183,130	1,860.6	92.0	4,067.5	3,975.5	14.5	5,850.7	7,956.7	1,514.1
Morinaga Milk Industry Co Ltd	Japan	JPY	314.00	382.00	250.00	82.2%	0.6	253,977	79,748.8	20,789.0	100,989.0	80,200.0	1,533.0	161,481.8	370,024.0	111,753.0
Nestle Sa	Switzerland	CHF	53.85	56.90	48.92	94.6%	0.8	3,465,000	186,590.3	16,246.0	20,100.0	3,854.0	731.0	191,175.3	111,641.0	62,598.0
Juhayna Food Industries	Egypt	EGP	5.51	6.50	3.93	84.8%	0.9	726,416	4,002.6	723.9	761.4	37.5	0.3	4,040.4	2,728.2	1,643.4

Tools for Analysis

If/Then Formulas

The standard format for these formulas is:

`=IF(logical_test,[value_if_true],[value_if_false])`

`=IF(B4>1000000, "High Income", "Low Income")`

If the logical test is true, the value_if_true reference will be returned to the cell where the formula is placed.

If the logical test is false, the value_if_false reference will be returned to the cell where the formula is placed.

Example: If the age is greater than 25, personal income will be the target income, else if the target income is less than or equal to 25, parent's income will be the target income.

	A	B	C	D	E	F	G
1	Target Age:	25					
2							
3	Age	Personal Income	Parent's Income	Target Income	Embedded Formula		
4	18	15,000	600,000	= 600,000	=IF(A4>\$B\$1,B4,C4)		
5	42	550,000	400,000	= 550,000	=IF(A5>\$B\$1,B5,C5)		
6	20	600,000	1,000,000	= 1,000,000	=IF(A6>\$B\$1,B6,C6)		
7	54	450,000	250,000	= 450,000	=IF(A7>\$B\$1,B7,C7)		
8	37	870,000	1,300,000	= 870,000	=IF(A8>\$B\$1,B8,C8)		
9	21	13,000	1,200,000	= 1,200,000	=IF(A9>\$B\$1,B9,C9)		
10							
11							
12							
13	If age is more than 25, personal income is the household income, else parent's income is the household income						
14							

Creating an If/Then Formula

1. Click the cell where the answer is to be placed.
2. Type `=IF(`
3. Type the argument; i.e.: `B4>1000000` followed by a comma.
4. In quotation marks, type the text to be returned OR the cell to be returned if the argument is true followed by a comma; i.e.: `"High Income"`
5. In quotation marks, type the text to be returned if the argument is false followed by a closed parenthesis; i.e.: `"Low Income"`
6. Press **Enter**.

Embedded If/Then Formulas

Within an IF function, either the value_if_true or the value_if_false reference can be another IF function. Up to seven IF statements can be embedded in one formula.

Example: If the age is greater than 25, personal income will be the target income. However, if say, personal income is less than or equal to 250,000, parents income will be the target income. If the personal income is greater than 250,000, personal income will be the target income.

	A	B	C	D	E	F	G	H	I
1	Target Age:	25							
2	Target Income:	250,000							
3	Age	Personal Income	Parent's Income	Target Income	Embedded Formula				
4	18	15,000	600,000	= 600,000	=IF(A4>\$B\$1,IF(B4>\$C\$2,B4,C4),C4)				
5	42	550,000	400,000	= 550,000	=IF(A5>\$B\$1,IF(B5>\$C\$2,B5,C5),C5)				
6	20	600,000	1,000,000	= 1,000,000	=IF(A6>\$B\$1,IF(B6>\$C\$2,B6,C6),C6)				
7	54	450,000	250,000	= 450,000	=IF(A7>\$B\$1,IF(B7>\$C\$2,B7,C7),C7)				
8	37	870,000	1,300,000	= 870,000	=IF(A8>\$B\$1,IF(B8>\$C\$2,B8,C8),C8)				
9	21	13,000	1,200,000	= 1,200,000	=IF(A9>\$B\$1,IF(B9>\$C\$2,B9,C9),C9)				
10									
11									
12									
13	If age is more than 25 and if personal income is more than 250,000, personal income is the household income, else parent's income is the household income								
14									

Using the IF function with OR / AND Functions

The **OR** command checks whether any of the arguments are TRUE, and returns TRUE or FALSE. It will return FALSE only if **all** arguments are false.

The standard format for this formula is:

`=OR(logical1,logical2...)`

The **AND** command checks whether all arguments are TRUE, and returns TRUE if **all** arguments are TRUE. Otherwise it will return FALSE.

The standard format for this formula is:

`=AND(logical1,logical2...)`

OR and **AND** functions can be used to set the argument in an **IF** function.

In the following example, IF the person is either older than 25 OR makes more than 250,000, their Personal Income will be the Target Income, other wise the Parent's Income will be the Target Income.

`=IF(OR(logical1,logical2),value_if_true,value_if_false)`

	A	B	C	D	E	F	G	H	I
1	Target Age:	25							
2	Target Income:	250,000							
3	Age	Personal Income	Parent's Income	Target Income	Embedded Formula				
4	18	15,000	600,000	= 600,000	=IF(OR(A4<\$B\$1,B4<\$C\$2),C4,B4)				
5	42	550,000	400,000	= 550,000	=IF(OR(A5<\$B\$1,B5<\$C\$2),C5,B5)				
6	20	600,000	1,000,000	= 1,000,000	=IF(OR(A6<\$B\$1,B6<\$C\$2),C6,B6)				
7	54	450,000	250,000	= 450,000	=IF(OR(A7<\$B\$1,B7<\$C\$2),C7,B7)				
8	37	870,000	1,300,000	= 870,000	=IF(OR(A8<\$B\$1,B8<\$C\$2),C8,B8)				
9	21	13,000	1,200,000	= 1,200,000	=IF(OR(A9<\$B\$1,B9<\$C\$2),C9,B9)				
10									
11									
12									
13	If age is less than 25 OR if personal income is less than 250,000, parent's income is the household income, else personal income is the household income								
14									

In the following example, IF the person is both older than 25 AND makes more than 250,000, their Personal Income will be the Target Income, other wise the Parent's Income will be the Target Income.

`=IF(AND(logical1,logical2),value_if_true,value_if_false)`

	A	B	C	D	E	F	G	H	I
1	Target Age:	25							
2	Target Income:	250,000							
3	Age	Personal Income	Parent's Income	Target Income	Embedded Formula				
4	18	15,000	600,000	= 600,000	=IF(AND(A4>\$B\$1,B4>\$C\$2),B4,C4)				
5	42	550,000	400,000	= 550,000	=IF(AND(A5>\$B\$1,B5>\$C\$2),B5,C5)				
6	20	600,000	1,000,000	= 1,000,000	=IF(AND(A6>\$B\$1,B6>\$C\$2),B6,C6)				
7	54	450,000	250,000	= 450,000	=IF(AND(A7>\$B\$1,B7>\$C\$2),B7,C7)				
8	37	870,000	1,300,000	= 870,000	=IF(AND(A8>\$B\$1,B8>\$C\$2),B8,C8)				
9	21	13,000	1,200,000	= 1,200,000	=IF(AND(A9>\$B\$1,B9>\$C\$2),B9,C9)				
10									
11									
12									
13	If age is more than 25 and if personal income is more than 250,000, personal income is the household income, else parent's income is the household income								
14									

The SumIf Command

The **SUMIF** command will add values in a range if the values meet certain constraints.

The standard format for this formula is:

=SUMIF(range,criteria,sum_range)

Calculate the total commissions of Salesperson1, if the sales on the products are more than \$25,000, using SUMIF formula.

=SUMIF(C6:C15,">25000",D6:D15)

If the values in range C6:C15 are over 25000, then it adds the corresponding values in the range D6:D15.

	A	B	C	D	E	F	G
1	Salespeople receive commissions on sales over \$25,000						
2	How much will Salesperson 1 receive?						
3							
4	Salesperson 1						
5			Sales	Commissions			
6		Product 1	\$50,000	\$2,500			
7		Product 2	\$15,000	\$750			
8		Product 3	\$20,000	\$1,000			
9		Product 4	\$30,000	\$1,500			
10		Product 5	\$75,000	\$3,750			
11		Product 6	\$5,000	\$250			
12		Product 7	\$45,000	\$2,250			
13		Product 8	\$65,000	\$3,250			
14		Product 9	\$35,000	\$1,750			
15		Product 10	\$20,000	\$1,000			
16		Total Commissions Paid	\$15,000	=SUMIF(C6:C15,D17,D6:D15)			
17		on Sales Over \$25,000	>25000				
18							

The Average-If Command

The **AverageIf** returns the average (arithmetic mean) of all the cells in a range that meet a given criteria. This works similarly to the SumIf statement and has the same syntax.

In the following example, we will find out the average of all commissions less than \$23,000. The formula in cell C11 will take the average of C5:C11, if the values in the range from B5:B11 are over 300,000.

The standard format for this formula is:

=AVERAGEIF(range, criteria, [average_range])

=AVERAGEIF(B5:B11,"<300000",C5:C11)

	A	B	C	D	E	F
1	Averaging property values and commissions					
2	Find out the Average of commissions on property value less than \$300,000					
3						
4		Property Value	Commission			
5		\$100,000.0	\$7,000.0			
6		\$200,000.0	\$14,000.0			
7		\$300,000.0	\$21,000.0			
8		\$400,000.0	\$28,000.0			
9		\$50,000.0	\$3,500.0			
10		\$450,000.0	\$31,500.0			
11		\$350,000.0	\$24,500.0			
12		Average commission	\$8,166.7	=AVERAGEIF(B5:B11,C13,C5:C11)		
13		paid on property value	<300000			
14		less than \$300,000				

The SumProduct Command

The SumProduct command multiplies corresponding components in the given arrays, and returns the sum of those products.

Here, we are finding out the weighted average score of the class. In a class of 60, we are given that average weight of 20 students scored 100 marks, 35 students scored 50 and the remaining 5 students scored 35 marks.

The standard format for this formula is:

`=SUMPRODUCT(array1, [array2], [array3], ...)`

`=SUMPRODUCT(B5:B7,C5:C7)`

To find out the weighted average score of the class, we use the following formula:

`=SUMPRODUCT(B5:B7,C5:C7)/SUM(B5:B7)`

	A	B	C	D	E	F
1	Calculate average score of the class.					
2						
3						
4		Students	Score			
5		20	100.0			
6		35	50.0			
7		5	35.0			
8		Average	65.4	<code>=SUMPRODUCT(B5:B7,C5:C7)/SUM(B5:B7)</code>		
9						

The MID Command

The MID command returns a specific number of characters from a text string, starting at the position you specify, based on the number of characters you specify. MID always counts each character, whether single-byte or double-byte, as 1, no matter what the default language setting is.

In the example, we want to take “Steve Jobs” and “Apple Inc.” from the sentence so that it can match our criteria.

The standard format for this formula is:

`=MID(text, start_num, num_chars)`

`=MID(B4,1,10)`

`=MID(B4,25,10)`

	A	B	C	D
1	To split words/characters from a text.			
2				
3				
4		Steve Jobs is the CEO of Apple Inc.		
5				
6		CEO	Company	
7		Steve Jobs	Apple Inc	
8		<code>=MID(B4,1,10) =MID(\$B\$4,25,10)</code>		
9				

The LEFT/RIGHT Command

LEFT/RIGHT returns the first character or characters in a text string, based on the number of characters you specify. LEFT/RIGHT always counts each character, whether single-byte or double-byte, as 1, no matter what the default language setting is.

Consider the above example.

Steve Jobs is the CEO of Apple Inc.

The standard format for this formula is:

`=LEFT(text, [num_chars])`

`=LEFT(B4,5)`

`=RIGHT(text, [num_chars])`

`=RIGHT(B4,10)`

	A	B	C	D	E
1	Find only the First name of the CEO using "LEFT" function				
2					
3					
4		Steve Jobs is the CEO of Apple Inc.			
5					
6		CEO	Company		
7		Steve	Apple Inc.		
8		<code>=LEFT(B4,5) =RIGHT(B4,10)</code>			
9					

The IRR Command

The IRR command returns the internal rate of return for a series of cash flows represented by the numbers in values. These cash flows do not have to be even, as they would be for an annuity. However, the cash flows **must occur at regular intervals**, such as monthly or annually. The internal rate of return is the interest rate received for an investment consisting of payments (negative values) and income (positive values) that occur at regular periods.

The standard format for this formula is:

`=IRR(values, [guess])`

`=IRR(B$4:B8)` (Investment's internal rate of return after four years.)

`=IRR(B$4:B9)` (Internal rate of return after five years.)

`=IRR(B$4:B6,-10%)` (To calculate the internal rate of return after two years, you need to include a guess.)

The IRR function syntax has the following arguments (argument: A value that provides information to an action, an event, a method, a property, a function, or a procedure.):

	A	B	C	D	E	F	G	H
1	Find out the IRR for the business							
2								
3		Cash Flows Transaction						
4		(70,000.0)	Initial cost of a business					
5		12,000.0	Net income for the first year					
6		15,000.0	Net income for the second year					
7		18,000.0	Net income for the third year					
8		21,000.0	Net income for the fourth year					
9		26,000.0	Net income for the fifth year					
10								
11		<code>=IRR(B\$4:B8)</code>	(2.1%)	Investment's internal rate of return after four years.				
12		<code>=IRR(B\$4:B9)</code>	8.7%	Internal rate of return after five years.				
13		<code>=IRR(B\$4:B6,-10%)</code>	(44.4%)	To calculate the internal rate of return after two years, you need to include a guess.				
14								

Note: [guess] is an optional input. Excel iterates to arrive at an answer. If the answer requires much iteration, the result may be a #VALUE! Error. A "guess" tells excel approximately where to start from so it requires fewer iterations (i.e. 1.0%, 10.0%, 100.0% ...) etc.

The XIRR Command

The XIRR command returns the internal rate of return for a schedule of cash flows that is not **necessarily periodic**. XIRR expects at least one positive cash flow (returns) and one negative cash flow (investment); otherwise, XIRR returns the #NUM! Error value.

The standard format for this formula is:

`=XIRR(values, dates, [guess])`

`=XIRR(B5:B9,C5:C9,100.0%)`

Guess parameter is optional. A number that you guess is close to the result of IRR.

	A	B	C	D	E	F	G	H
1	Find out the XIRR for the business							
2	<i>Calculates the Internal rate of return for a schedule of cash flows that's not periodic</i>							
3								
4		Cash Flows		Date				
5		(10,000.0)	1-Jan-08					
6		2,750.0	1-Mar-08					
7		4,250.0	30-Oct-08					
8		3,250.0	15-Feb-09					
9		2,750.0	1-Apr-09					
10		37.3% Internal rate of return in 1.25 years						
11		<code>=XIRR(B5:B9,C5:C9,)</code>						
12								

The RATE Command

The RATE command returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! Error value. It can also be used to calculate the CAGR for a given period.

The standard format for this formula is:

`=RATE(nper, pmt, pv, [fv], [type], [guess])`

`=RATE(B5*12,B6,B7)*12`

	A	B	C	D
1	Calculate Interest rate per year			
2				
3				
4		Data		Description
5		4.0	Years of the loan	
6		(200.0)	Monthly payment	
7		8,000.0	Amount of the loan	
8				
9		9.2% Interest rate per year		
10		<code>=RATE(B5*12,B6,B7)*12</code>		
11				

Calculate the revenue CAGR for the period.

	A	B	C	D	E	F	G	H	I
1	Calculate the revenues CAGR for the period								
2									
3		Projected Fiscal Year					CAGR		
4		2010	2011	2012	2013	2014	2010-14		
5	Revenues	4,000.0	4,841.0	3,200.0	5,555.0	6,000.0	10.7%		
6		<code>=RATE(4,0,-C5,G5)</code>							
7									

Use the following formula.

`=RATE(4,0,-F5,J5)`

4 is the number of forecasted years from the investment year. -F5 is the starting point of the investment or in this case, revenues. And J5 is the revenue at the end of 2014.

Other Time Value of Money Commands

The PMT command returns the periodical payment that is paid / received on a loan or investment.

D	E	F	G
Calculate Installment per month			
	Data	Description	
	4.0	Years of the loan	
	12.0%	Annual interest rate	
	15,000.0	Loan taken	
	(1,000.0)	Final payment	
	(378.7)	Monthly instalment	
	=PMT(E6/12,E5*12,E7,E8)		

The FV command returns the future value of an even stream of cash flows

G	H	I	J
Calculate Future Value			
	Data	Description	
	4.0	Years of the loan	
	12.0%	Annual interest rate	
	15,000.0	Loan taken	
	(1,000.0)	Payments made	
	(18,823.5)	Future Value	
	=FV(H6,H5,H8,H7)		

The PV command returns the present value of an even stream of cash flows

K	L	M
Calculate Present Value		
	Data	Description
	4.0	Years of the loan
	12.0%	Annual interest rate
	15,000.0	Amount to be paid at end of 4 years
	1,000.0	Amount to be paid each year
	(12,570.1)	Present Value
	=PV(K6,K5,K8,K7)	

The NPV command returns the net present value of a series of cash flows. It discounts each cash flow by the discount rate for the given number of years, and sums these discounted cash flows.

However, to calculate the NPV after taking into consideration initial investment, the Year 0 cash outflow must be subtracted separately, since this is not supposed to be discounted.

13	Calculate Net Present Value		
14			
15			
16	Year	Description	Cash Flow
17	0	Initial Investment	(10,000.0)
18	1	Year 1 Cash Flow	1,000.0
19	2	Year 2 Cash Flow	1,500.0
20	3	Year 3 Cash Flow	2,500.0
21	4	Year 4 Cash Flow	3,500.0
22	5	Year 5 Cash Flow	5,000.0
23			
24	Interest rate		8.0%
25			
26	Net Present Value		172.0
27	=NPV(D24,D18:D22)+D17		
28			

DATE Commands

Excel has various commands to use with dates.

YEAR, MONTH, AND DAY commands are used to extract the year, month, and day from a date.

	A	B	C	D	E	F	G	H
1								
2								
3								
4		6/30/2015	Extract the year		2015	=YEAR(\$B\$4)		
5			Extract the month		6	=MONTH(\$B\$4)		
6			Extract the day		30	=DAY(\$B\$4)		
7								
8								

The DATE command, used along with YEAR, MONTH and DAY, can be used to add a specified number of years, months, or days to a given date. This is especially useful when making time series data.

	A	B	C	D	E	F	G
9							
10		12/31/2014	Add 3 months to the given date				
11		3/31/2015	=DATE(YEAR(B10),MONTH(B10)+3,DAY(B10))				
12							

The TODAY command returns today's date.

	A	B	C	D	E	F	G	H
12								
13								
14		What is today's date?		3/18/2016	=TODAY()			
15								
16								

The EOMONTH command is used to add a specified number of months to a given date, and returns the last day of the month. This is useful when making monthly / quarterly time series data, where we need the end of the month / quarter. It is superior than using the DATE command, since by default it gives the last date of the month, and hence the date will be 28th, 30th, or 31st for various months respectively.

	A	B	C	D	E	F	G
15							
16							
17	-3	12/31/2013	=EOMONTH(B18,A17)				
18	-3	3/31/2014	=EOMONTH(B19,A18)				
19	-3	6/30/2014	=EOMONTH(B20,A19)				
20	-3	9/30/2014	=EOMONTH(B21,A20)				
21		12/31/2014	Make a series of 4 quarters before and after the given date				
22	3	3/31/2015	=EOMONTH(B21,A22)				
23	3	6/30/2015	=EOMONTH(B22,A23)				
24	3	9/30/2015	=EOMONTH(B23,A24)				
25	3	12/31/2015	=EOMONTH(B24,A25)				
26							

The INDIRECT Command

The INDIRECT command returns the reference specified by a text string. References are immediately evaluated to display their contents. Use INDIRECT when you want to change the reference to a cell within a formula without changing the formula itself.

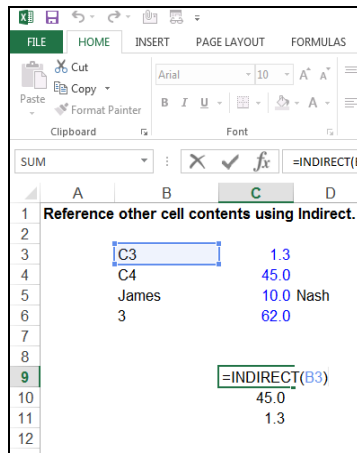
The standard format for this formula is:

`=INDIRECT(ref_text, [a1])`

`=INDIRECT(B3)`

`=INDIRECT(B4)`

`=INDIRECT("C"&B6)`



INDIRECT command will not change if rows or columns are added, and are thus useful when performing operations on an array of values.

	A	B	C	D	E	F	G	H
13								
14								
15		12.0						
16		13.0						
17		10.0						
18		8.0						
19		7.0						
20		5.0						
21		4.0						
22		15.0		B			15	
23		22.0		B			24	
24		18.0						
25								

IFERROR Command

ISERROR command returns a value depending whether the cell contents has an error or not. It is also used in conjunction with the IF function to perform a different action if an error occurs.

The standard format for this formula is:

`=IFERROR(formula, "NA")`

`=IFERROR(C4+C5+C6, "The cell has an error")`

AVERAGE Command

The average command returns the average of the selected numbers.

Syntax: *AVERAGE(number1, [number2], ...)*

MEDIAN Command

The MEDIAN command returns the median of the selected numbers.

Syntax: *MEDIAN(number1, [number2], ...)*

MAX Command

The MAX command returns the maximum value of the selected numbers.

Syntax: *MAX(number1, [number2], ...)*

MIN Command

The MIN command returns the minimum value of the selected numbers.

The standard format for this formula is:

Syntax: *MIN(number1, [number2], ...)*

	A	B	C	D	E	F
1	Calculate The Mean, Median, Max, Min of The Selected Numbers					
2						
3						
4						
5			Numbers			
6			145,454.0			
7			145,679.0			
8			35,000.0			
9			100,000.0			
10			1,545,445.0			
11			122,121.0			
12						
13		Mean	348,949.8	=AVERAGE(C\$6:C\$11)		
14		Median	133,787.5	=MEDIAN(C\$6:C\$11)		
15		Max	1,545,445.0	=MAX(C\$6:C\$11)		
16		Min	35,000.0	=MIN(C\$6:C\$11)		
17						
18						

FIND/SEARCH Command

FIND locate one text string within a second text string, and return the number of the starting position of the first text string from the first character of the second text string. FIND is **case sensitive** whereas SEARCH is **not case sensitive**.

The standard format for this formula is:

=*FIND(find_text, within_text, [start_num])*

=*SEARCH(find_text, within_text, [start_num])*

	A	B	C	D	E	F	G	H	I
1	To find the character no. in a character string								
2									
3									
4									
5			TresVista has established itself as the high-end financial service provider of choice.						
6									
7		financial	50	=FIND(B7,B\$5,1)					
8		financial	50	=SEARCH(B8,B\$5,1)					
9									
10		Financial	#VALUE!	=FIND(B10,B\$5,1)					
11		Financial	50	=SEARCH(B11,B\$5,1)					
12									
13									

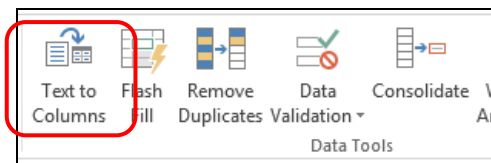
Text to Columns

Consider the following example:

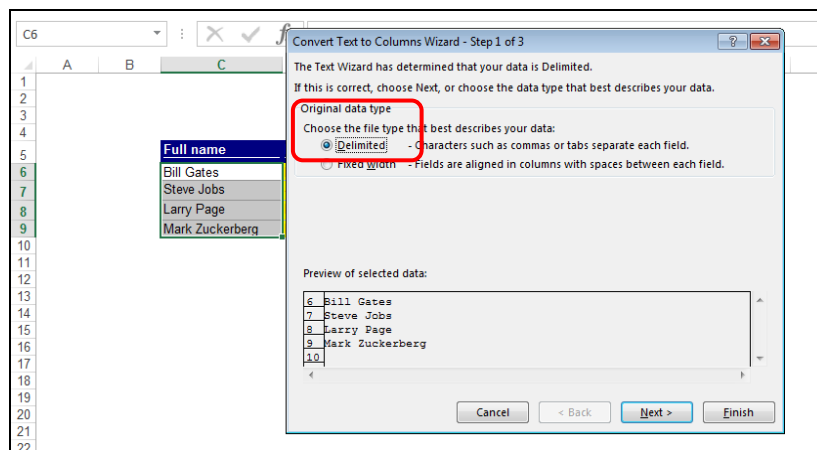
Full name	First name	Last name
Bill Gates	Bill	Gates
Steve Jobs	Steve	Jobs
Larry Page	Larry	Page
Mark Zuckerberg	Mark	Zuckerberg

Use this method if your names have a delimited format, such as "First_name Last_name" (where the space between First_name and Last_name is the delimiter) or "Last_name, First_name" (where the comma is the delimiter).

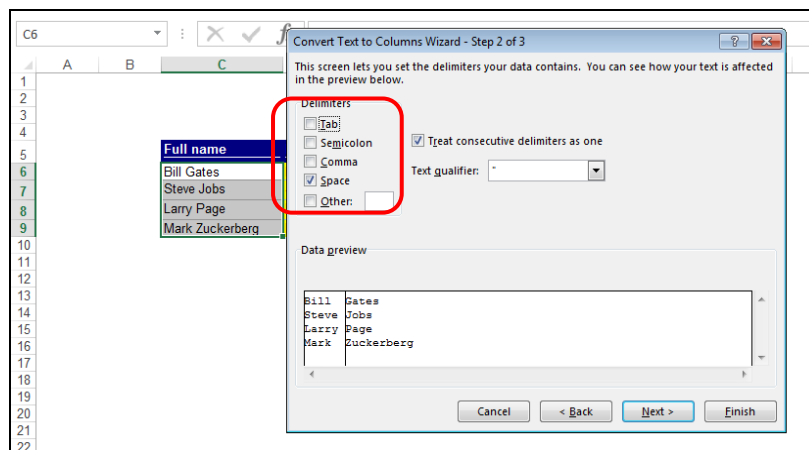
1. Select the range of data that you want to convert.
2. On the Data tab, in the Data Tools group, click Text to Columns.



3. In Step 1 of the Convert Text to Columns Wizard, click Delimited, and then click Next.



4. In Step 2, select the Space check box, and then clear the other check boxes under Delimiters.

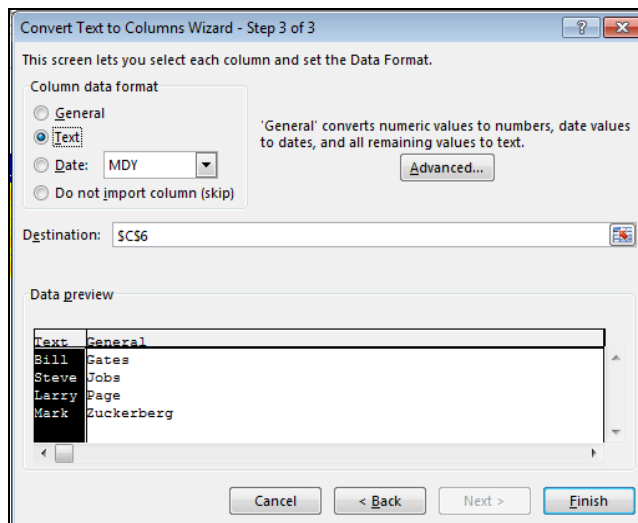


5. Click Next.
6. In Step 3, click a column in the Data preview box and then, under Column data format, click Text.

Repeat this step for each column in the Data preview box.

7. If you want to insert the separated content into the columns next to the full name, click the icon to the right of the Destination box, and then select the cell next to the first name in the list.

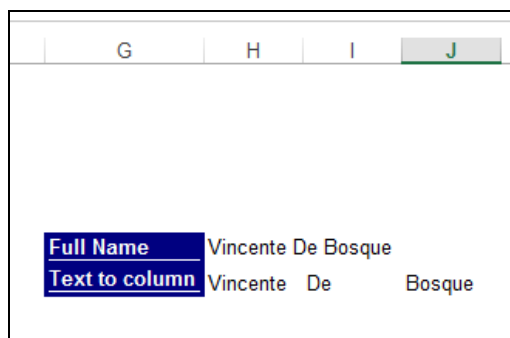
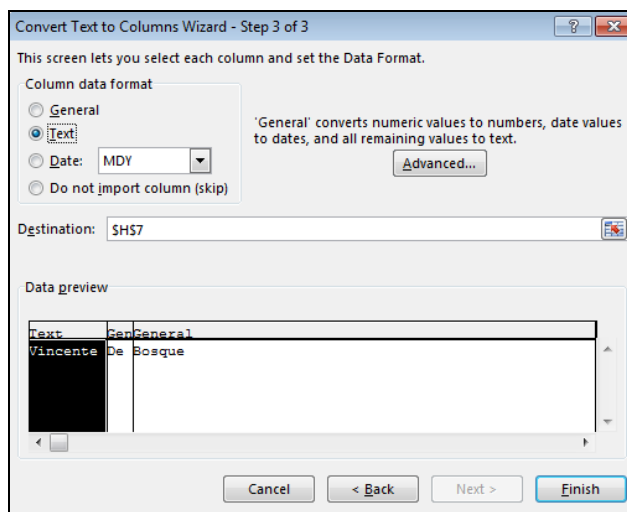
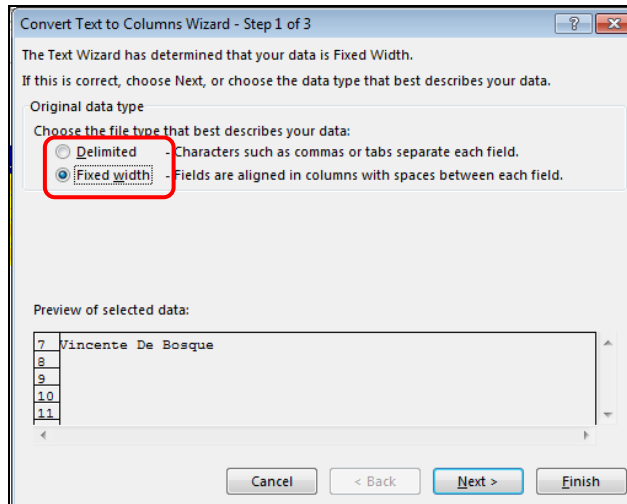
Important: If you do not specify a new destination for the new columns, the split data will replace the original data.



	A	B	C	D	E	F
1						
2						
3						
4						
5			Full name	First name	Last name	
6			Bill Gates	Bill	Gates	
7			Steve Jobs	Steve	Jobs	
8			Larry Page	Larry	Page	
9			Mark Zuckerberg	Mark	Zuckerberg	
10						
11						

Split Cell Content based on a Column Break

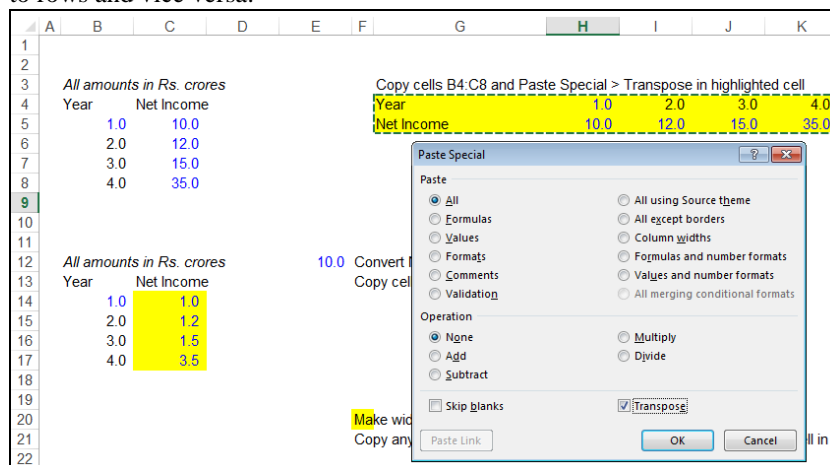
1. Select the cell or range of cells that contains the data that you want to split.
2. On the Data tab, in the Data Tools group, click Text to Columns.
3. In Step 1 of the Convert Text to Columns Wizard, click Fixed Width, and then click Next.
4. In the Data preview box, drag a line to indicate where you want the content to be divided.



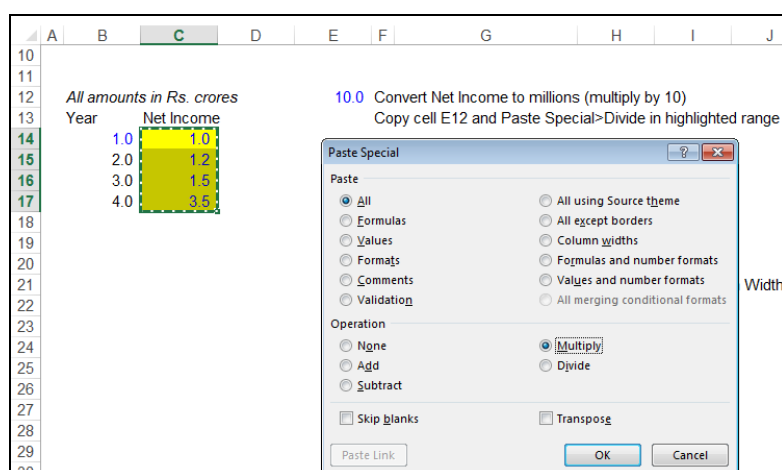
PASTE SPECIAL

Paste Special (**Ctrl+Alt+V** / **Alt+H+V+S+V**) can be used to perform various functions, such as paste only values, or only formulae, or only formats, column width, etc. We will see a few such functions.

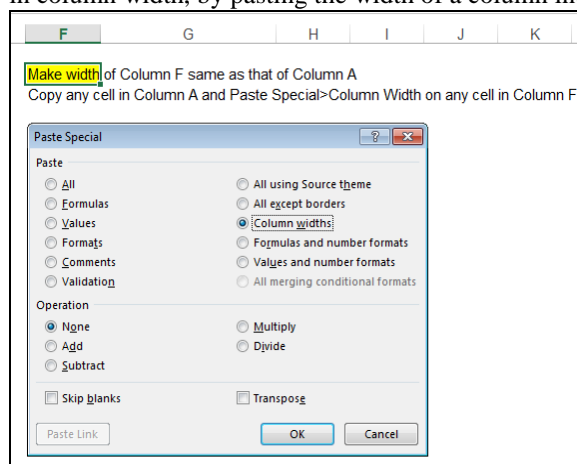
Paste Special > Transpose (**Ctrl+Alt+V+E** / **Alt+H+V+S+E**) is used to rearrange data from columns to rows and vice versa.



Paste Special > Multiply (**Ctrl+Alt+V+M** / **Alt+H+V+S+M**) is used to multiply all numbers in an array by a constant



Paste Special > Column Width (**Ctrl+Alt+V+W** / **Alt+H+V+S+W**) is used to maintain consistency in column width, by pasting the width of a column into another column.



VLOOKUP and HLOOKUP Functions

HLOOKUP Searches for a value in the top row of a table or an array of values, and then returns a value in the same column from a row you specify in the table or array. Use HLOOKUP when your comparison values are located in a row across the top of a table of data, and you want to look down a specified number of rows. Use VLOOKUP when your comparison values are located in a column to the left of the data you want to find.

The H in HLOOKUP stands for "Horizontal." The V in VLOOKUP stands for "Vertical".

=HLOOKUP(lookup_value,table_array,row_index_num,range_lookup)

=VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

	A	B	C	D	E	F
1		Lookup Month	FEB			
2		Referenced HLOOKUP	\$9,375	=HLOOKUP(C1,\$C\$7:\$E\$12,A10,FALSE)		
3		Hardcoded HLOOKUP	\$9,375	=HLOOKUP("FEB",\$C\$7:\$E\$12,4,FALSE)		
5		Referenced VLOOKUP	\$9,375	=VLOOKUP(B10,B7:E13,3,FALSE)		
7	1		JAN	FEB	MAR	
8	2	Sales	\$10,000	\$12,500	\$8,000	
9	3	Expenses	(2,500)	(3,125)	(2,000)	
10	4	Operating Earnings	\$7,500	\$9,375	\$6,000	
11	5	Taxes	(2,500)	(3,125)	(2,000)	
12	6	Net Income	\$5,000	\$6,250	\$4,000	
13						
14						
15						

VLOOKUP and HLOOKUP Functions with INDIRECT

VLOOKUP and HLOOKUP can be used with the INDIRECT function to source data across sheets. It is especially useful when you have a number of sheets (for e.g.: for different segments of a company) and you wish to pull specific numbers for each of the segments. Use the INDIRECT function to source the array field in the VLOOKUP and HLOOKUP syntax.

Please note that in the formula below the syntax should be followed exactly. The “” is so that the formula still recognizes the values in the cell even if they have a space in the sheet names.

=VLOOKUP(lookup_value, indirect(“”&sheet name&””!array”), col_index_num,

[range_lookup])

=HLOOKUP(lookup_value, indirect(sheet name&”!array”), row_index_num, [range_lookup])

	A	B	C	D
1				
2			Sheet 2	Sheet 3
3		Revenue	=VLOOKUP(\$B3,INDIRECT(“”&C\$2&””!B01:G100”),2,FALSE)	=VLOOKUP(\$B3,INDIRECT(“”&D\$2&””!B01:G100”),2,FALSE)
4		EBITDA	=VLOOKUP(\$B4,INDIRECT(“”&C\$2&””!B01:G100”),2,FALSE)	=VLOOKUP(\$B4,INDIRECT(“”&D\$2&””!B01:G100”),2,FALSE)
5		Net Income	=VLOOKUP(\$B5,INDIRECT(“”&C\$2&””!B01:G100”),2,FALSE)	=VLOOKUP(\$B5,INDIRECT(“”&D\$2&””!B01:G100”),2,FALSE)
6				
7				

INDEX and MATCH Functions

INDEX and MATCH performs lookups that VLOOKUP can't, and runs much faster on large spreadsheets. INDEX MATCH works very well if your lookup data is not in the first column, or you want to look to the left of the lookup data, rather than to the right.

These functions can be made more flexible by using them with other functions such as VLOOKUP and INDIRECT.

=INDEX(result_array,row_number)

=INDEX(result_array,MATCH(lookup_value,lookup_array,0))

	A	B	C	D	E	F
1		Lookup Field	Taxes			
3			(\$338)	=INDEX(D5:D10,MATCH(C1,B5:B10,0))		
5	1		JAN	FEB	MAR	
6	2	Sales	\$1,500	\$1,350	\$1,580	
7	3	Expenses	(375)	(338)	(395)	
8	4	Operating Earnings	\$1,125	\$1,013	\$1,185	
9	5	Taxes	(375)	(338)	(395)	
10	6	Net Income	\$750	\$675	\$790	
11						

Goal Seek

Keyboard shortcut: **ALT+T+G / ALT+A+W+G**

1. Click on **Data**, then under Data Tools go to What-if Analysis and select Goal Seek. Click in the cell where the target value is to be located. This cell must contain a formula. Press the Tab key.
2. Type the target value. Press the Tab key.
3. Click on the cell to be changed. This cell must contain a value. Click on OK.
4. If the goal seek returns the desired value, click OK, if not, click on Cancel.

Example: The following example will find what the present value of a mortgage would be if monthly payments were \$1,000. Cell C1 contains the PMT formula; cell D4 contains a value.

$=PMT(rate,nper,pv,[fv],[type])$

$=PMT(D2/12,D3*12,D4,D5,D6)$

	A	B	C	D	E	F	G	H	I
1		Monthly Payment =	(\$840.85)						
2			Interest Rate:	9.50%					
3			Number of Periods:	30					
4			Present Value:	\$100,000.00					
5			Future Value:	\$0.0					
6			Type:	0					
7									For the Type:
8									Use "0" if Payment is at the end of the period
9									Use "1" if Payment is at the Beginning of the Period.
10									
11									
12									
13									
14									
15									
16									

Goal Seek

Set cell:

To value:

By changing cell:

	A	B	C	D	E	F	G	H	I
1		Monthly Payment =	(\$1,000.00)						
2			Interest Rate:	9.50%					
3			Number of Periods:	30					
4			Present Value:	\$118,926.68					
5			Future Value:	\$0.0					
6			Type:	0					
7									For the Type:
8									Use "0" if Payment is at the end of the period
9									Use "1" if Payment is at the Beginning of the Period.
10									
11									
12									
13									
14									
15									
16									
17									

Goal Seek Status

Goal Seeking with Cell C1 found a solution.

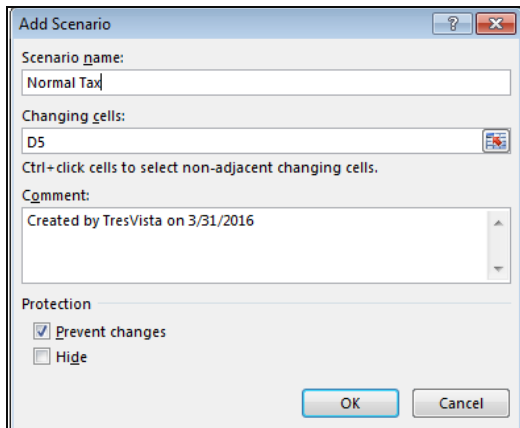
Target value: -1000

Current value: (\$1,000.00)

Creating Scenarios

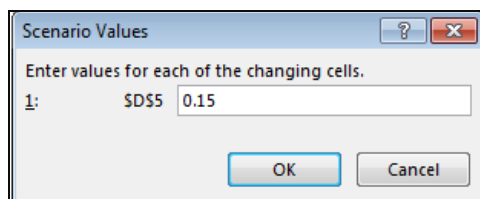
1. Click on Data, then under Data Tools group go to What-if Analysis and select Scenario Manager.
(Keyboard shortcut: **ALT+A+W+S**)
2. Click on Add.

The following dialog box will appear:



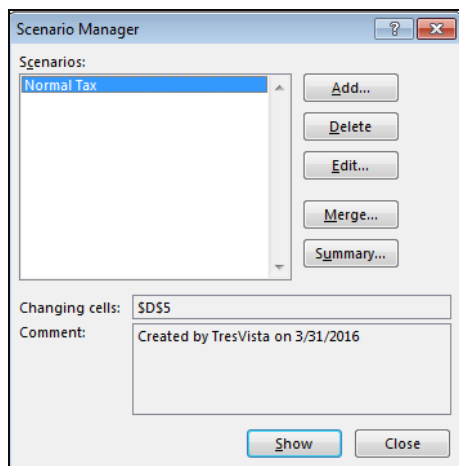
3. Type the scenario name (up to 255 characters).
4. Click OK.

The following dialog box will appear:



5. Type the value being represented by the scenario name.
6. Click on OK.

The main scenario dialog box will appear:



7. Repeat steps 4-7 to add scenarios
8. Click on the scenario to be viewed
9. Click on Show.

Using the Choose Function to Create Scenarios

The CHOOSE command uses an index_num to return a value from the list of value arguments. Use CHOOSE to select one of up to 29 values based on the index number. For example, if value 1 through value 7 are the days of the week, CHOOSE returns one of the days when a number between 1 and 7 is used as index_num.

Unlike the Scenario function, which will be used seldom, using the CHOOSE function to create scenarios allows you manipulate multiple variables per scenario.

The following example will choose the inputs for the variables of EBITDA and Tax Rate based on the Case.

The standard format for this formula is:

=CHOOSE(index_num,value1,[value2],...)

	A	B	C	D	E
1		Cases			
2		1	2	3	
3	EBITDA	\$1,000,000	\$1,500,000	\$2,500,000	
4	Tax Rate	8.3%	15.0%	22.5%	
5					
6	Case	1			
7					
8	Earnings Before Taxes	\$1,000,000	=CHOOSE(\$B\$6,B3,C3,D3)		
9	Tax Rate	8.3%	=CHOOSE(\$B\$6,B4,C4,D4)		
10	Tax Expense	\$82,500			
11	Net Income	\$917,500			
12					
13					

	A	B	C	D	E
1		Cases			
2		1	2	3	
3	EBITDA	\$1,000,000	\$1,500,000	\$2,500,000	
4	Tax Rate	8.3%	15.0%	22.5%	
5					
6	Case	2			
7					
8	Earnings Before Taxes	\$1,500,000	=CHOOSE(\$B\$6,B3,C3,D3)		
9	Tax Rate	15.0%	=CHOOSE(\$B\$6,B4,C4,D4)		
10	Tax Expense	\$225,000			
11	Net Income	\$1,275,000			
12					
13					

	A	B	C	D	E
1		Cases			
2		1	2	3	
3	EBITDA	\$1,000,000	\$1,500,000	\$2,500,000	
4	Tax Rate	8.3%	15.0%	22.5%	
5					
6	Case	3			
7					
8	Earnings Before Taxes	\$2,500,000	=CHOOSE(\$B\$6,B3,C3,D3)		
9	Tax Rate	22.5%	=CHOOSE(\$B\$6,B4,C4,D4)		
10	Tax Expense	\$562,500			
11	Net Income	\$1,937,500			
12					
13					

Using the Offset Function to Create Scenarios

The OFFSET function returns a reference to a range that is a specified number of rows and/or columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned.

Unlike CHOOSE, the OFFSET function does not have limit on how many cases can be created.

The following example will choose the inputs for the variables of EBITDA and Tax Rate based on the Case. The OFFSET formula allows you to add additional cases without having to amend the input formulas (\$B\$8 and \$B\$9 in the above example) whereas in the CHOOSE function you would need to go into the input formula and reference the new row/column of cases.

The standard format for this formula is:

`=OFFSET(reference,rows,columns,[height],[width])`

	A	B	C	D	E
1	<u>Case</u>	<u>EBITDA</u>	<u>Tax Rate</u>		
2	1	\$1,000,000	0.0825		
3	2	\$1,500,000	0.1500		
4	3	\$2,500,000	0.2250		
5	4	\$3,000,000	0.3000		
6					
7	Case	2			
8					
9	Earnings Before Taxes	\$1,500,000	=OFFSET(\$B\$2,\$B\$6-1,)		
10	Tax Rate	15.0%	=OFFSET(\$C\$2,\$B\$6-1,)		
11	Tax Expense	\$225,000			
12	Net Income	\$1,275,000			
13					
14					

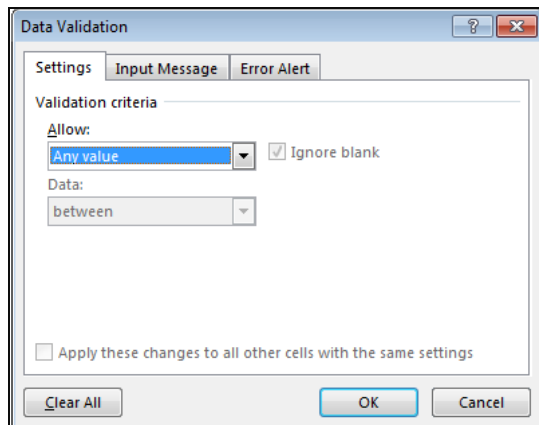
	A	B	C	D	E
1	<u>Case</u>	<u>EBITDA</u>	<u>Tax Rate</u>		
2	1	\$1,000,000	0.0825		
3	2	\$1,500,000	0.1500		
4	3	\$2,500,000	0.2250		
5	4	\$3,000,000	0.3000		
6					
7	Case	4			
8					
9	Earnings Before Taxes	\$3,000,000	=OFFSET(\$B\$2,\$B\$6-1,)		
10	Tax Rate	30.0%	=OFFSET(\$C\$2,\$B\$6-1,)		
11	Tax Expense	\$900,000			
12	Net Income	\$2,100,000			
13					

Data Validations

Keyboard shortcut: **Alt+A+V+V**

In the above example, we had to manually key-in the case number and also had to verify whether the case number existed on the list of available choices. If we had inputted say 10, the condition would not have satisfied, and hence the formulae wouldn't have worked. In order to ensure that the data entered by the user is correct and meets the condition, we use Data Validations.

The Data Validation window looks like this:



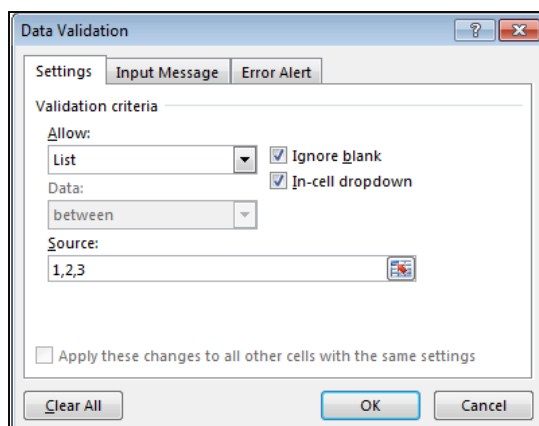
You can set aside the above conditions, such as to only allow a whole number, a decimal, a list, date, time, text length, and your custom function.

Consider the following example:

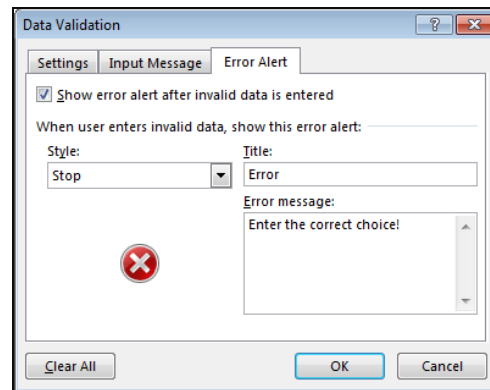
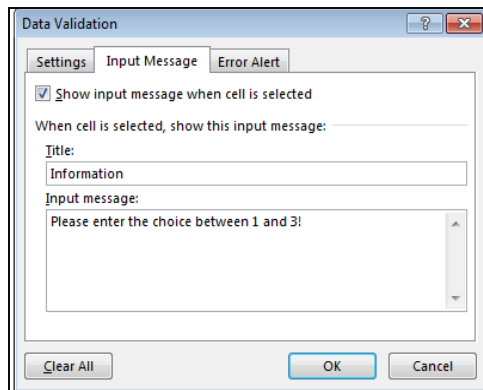
1	ABC Co.											
2	Sensitivity Sheet											
11												
12												
13	Iron-ore costs (USD/tonnes)	4										
14	Management Case											
15	Base Case											
16	Bear Case											
17	Global Prices long steel (USD/ton)	2										
18	Management Case											
19	Base Case											
20	Bear Case											
21												

Now, in the example given above, the user entered 4 (cell B13), and hence, the cells which are highlighted in gray are not functioning (which are using the choose function).

We will now introduce data validation in cell B13. Firstly, go directly to the target cell, in this case cell B13, and press **Alt+A+V+V**. You will see the following:



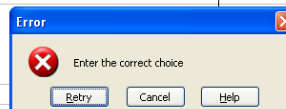
Go to List, and then in the source input your choices (in this case 1, 2, and 3) separated by a comma. Additionally, you can customize display message by going to Input Message tab. You can also setup an error message warning the user if an incorrect value has been entered.



1	ABC Co.											
2	Sensitivity Sheet											
11												
12												
13	Iron-ore costs (USD/tonnes)	1	120.0	150.0	83.0	145.0	145.0	145.0	145.0	145.0	145.0	145.0
14	Management Case					145.0	145.0	145.0	145.0	145.0	145.0	145.0
15	Base Case					158.7	143.6	141.8	121.4	114.9		
16	Bear Case					151.9	144.3	143.4	133.2	130.0		
17												
18	Global Prices long steel (USD/ton)	2	590.0	765.0	531.0	605.2	640.2	672.3	592.3	609.0		
19	Management Case					649.0	651.0	651.0	651.0	651.0		
20	Base Case					605.2	640.2	672.3	592.3	609.0		
21	Bear Case					627.1	645.6	661.6	621.7	630.0		

1	ABC Co.											
2	Sensitivity Sheet											
11												
12												
13	Iron-ore costs (USD/tonnes)	1	120.0	150.0	83.0	145.0	145.0	145.0	145.0	145.0	145.0	145.0
14	Management Case					145.0	145.0	145.0	145.0	145.0	145.0	145.0
15	Base Case					158.7	143.6	141.8	121.4	114.9		
16	Bear Case					151.9	144.3	143.4	133.2	130.0		
17												
18	Global Prices long steel (USD/ton)	2	590.0	765.0	531.0	605.2	640.2	672.3	592.3	609.0		
19	Management Case					649.0	651.0	651.0	651.0	651.0		
20	Base Case					605.2	640.2	672.3	592.3	609.0		
21	Bear Case					627.1	645.6	661.6	621.7	630.0		

1	ABC Co.											
2	Sensitivity Sheet											
11												
12												
13	Iron-ore costs (USD/tonnes)	4	120.0	150.0	83.0	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!		
14	Management Case					145.0	145.0	145.0	145.0	145.0		
15	Base Case					158.7	143.6	141.8	121.4	114.9		
16	Bear Case					144.3	143.4	133.2	130.0			
17												
18	Global Prices long steel (USD/ton)	2	590.0	765.0	531.0	640.2	672.3	592.3	609.0			
19	Management Case					651.0	651.0	651.0	651.0	651.0		
20	Base Case					640.2	672.3	592.3	609.0			
21	Bear Case					627.1	645.6	661.6	621.7	630.0		



Now, if you want to compare results with three scenarios and show the results accordingly, we need to do the following:

- To avoid this, we can use self-referencing cells to store a value under a scenario.

If you change a variable in the model:

- Data tables may be more appropriate, but may slow down the model.

Charting

Charts, also known as graphs, are illustrations used to simplify data and get a point across quickly. There are many types of charts that can be created; however, the basic setup is the same.

Creating a Chart (All except Pie Charts)

Tip: You can also create a chart by clicking on the **F11** key after you select the data range. The chart appears automatically in the default chart format.

Note: Before working on the charts, ensure that the TresVista IT Dept. has installed the TresVista color scheme file. This will ensure that the chart is color formatted in accordance to TresVista rules.

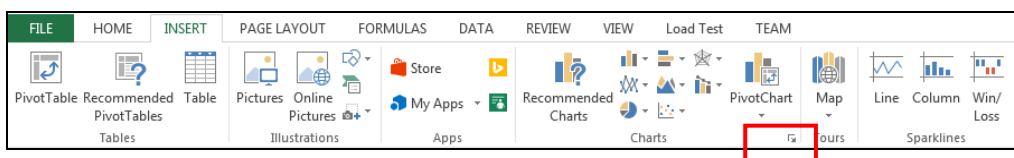
1. Select the data range to be charted. Include all data and labels in this range.

	A	B	C	D	E	F
1	Quarterly Sales					
2	From Regional Sales Data					
3						
4		Atlanta	Boston	Chicago	New York	Total
5	Qtr. 1	\$113,255	\$104,452	\$129,464	\$160,909	\$508,080
6	Qtr. 2	\$122,989	\$107,539	\$131,266	\$158,546	\$520,340
7	Qtr. 3	\$128,904	\$101,685	\$130,596	\$154,841	\$516,026
8	Qtr. 4	\$125,991	\$115,884	\$129,990	\$155,316	\$527,181
9	Total	\$491,139	\$429,560	\$521,316	\$629,612	\$2,071,627
10						
11						

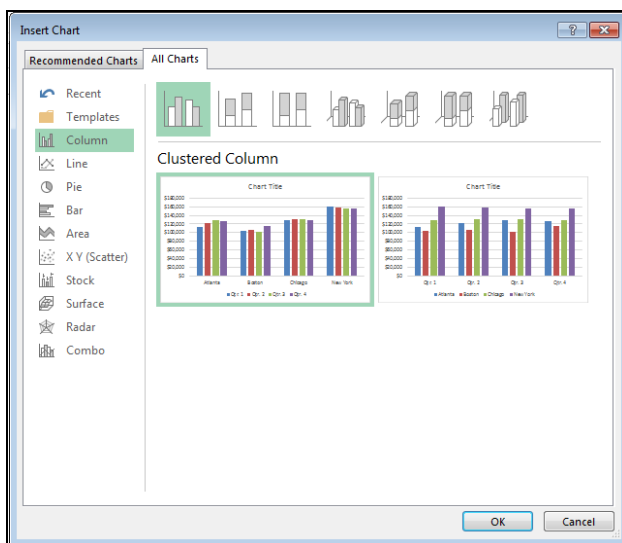
2. Click on the **Insert** and select the Chart type you want.

For e.g. If you want to select a column chart click on Column (Keyboard shortcut: ALT+N+C) depending on your preference.

To get the list of all the available charts click on the arrow key (Dialog Box launcher) which is located at the bottom right of the Charts group (Keyboard shortcut: ALT+N+K or ALT+I+H)

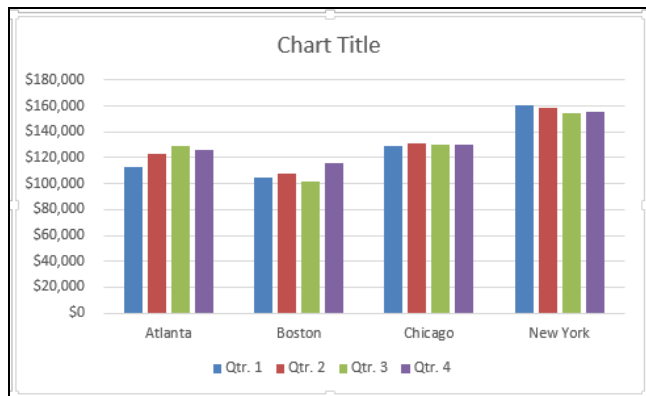


You will get the following screen.

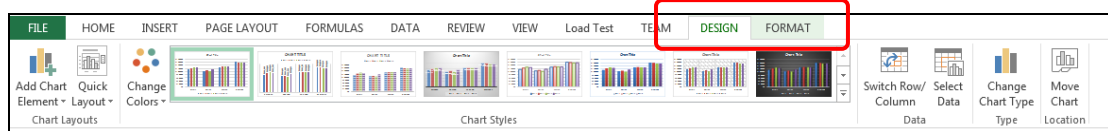


3. Select the Chart type and Chart sub-type and press OK.

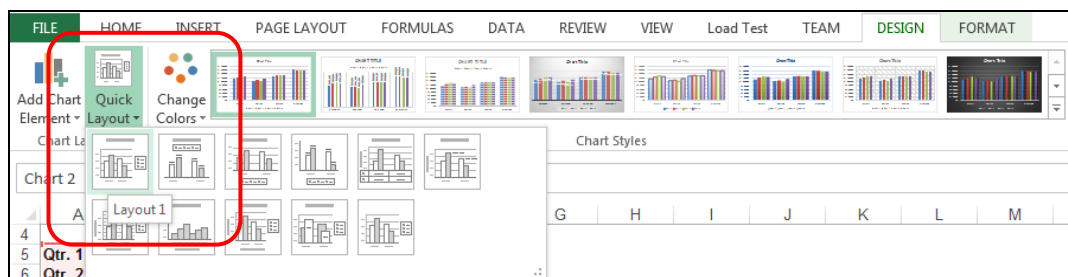
The following chart will appear:



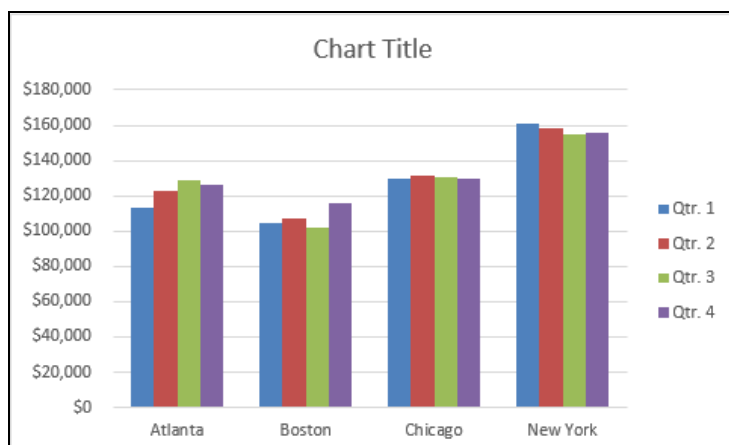
As soon as the chart is made, notice that in the ribbon you will now have additional tabs known as Chart Tools.



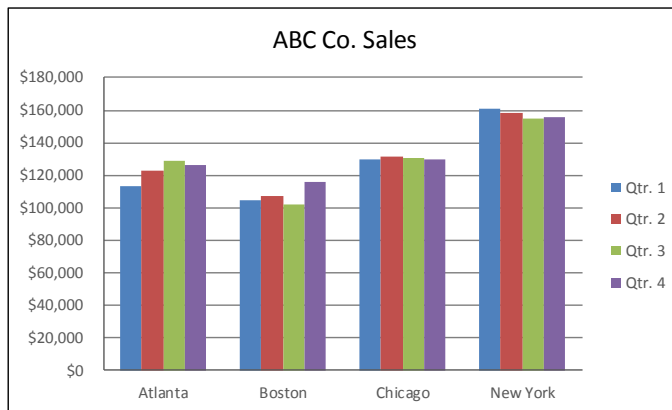
4. Depending on your color preference, you can select the various templates under the chart styles group. (Keyboard shortcut: **ALT+JC+S**).
5. Now, to select the various layouts, go to the chart layouts group and select the layout of the chart suited to you. (Keyboard shortcut: **ALT+JC+L**).



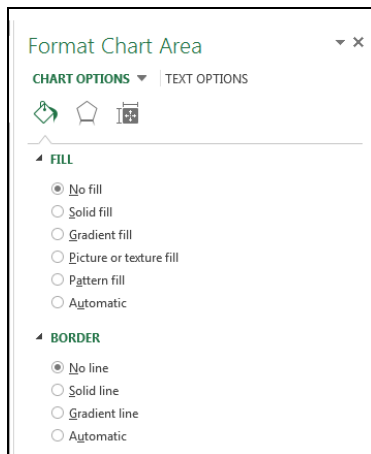
If you select the first option, your chart will now look like this.



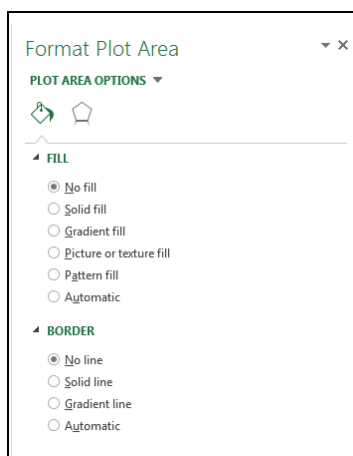
Change the Chart Title to ABC Co. Sales.



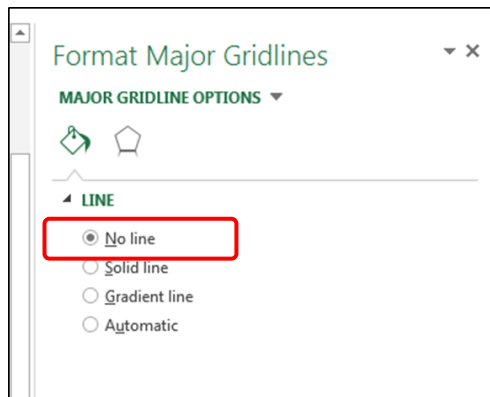
6. Right click on the chart to format the chart according to the following –
 - a. Select Format Chart Area
 - i. Set the background color to “No Fill”
 - ii. Set the border color to “No Line”



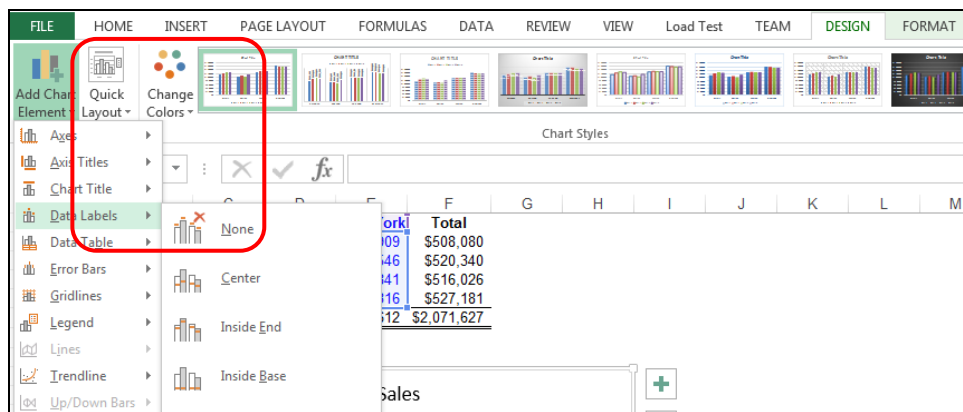
- b. Select Format Plot Area
 - i. Set the background color to “No Fill”
 - ii. Set the border color to “No Line”



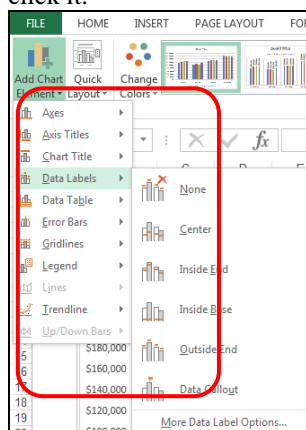
- c. Click on the gridlines and a screen will appear on the right hand side. Select “No Line” option



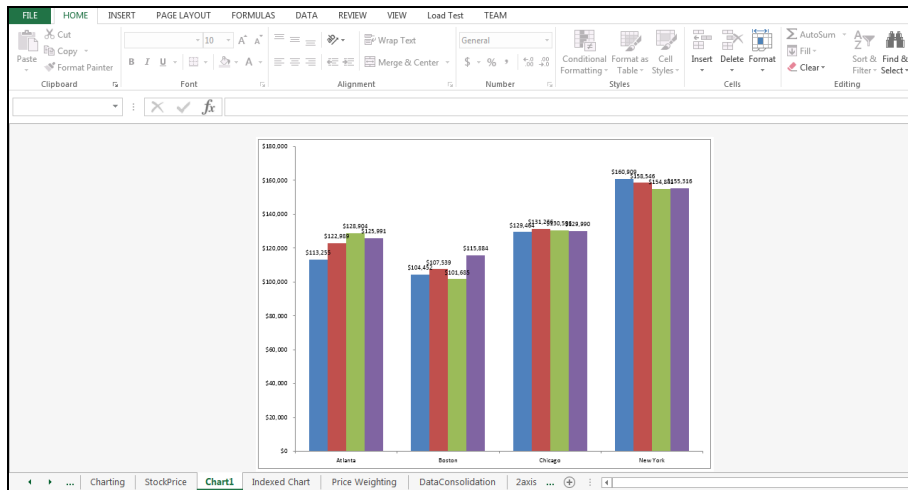
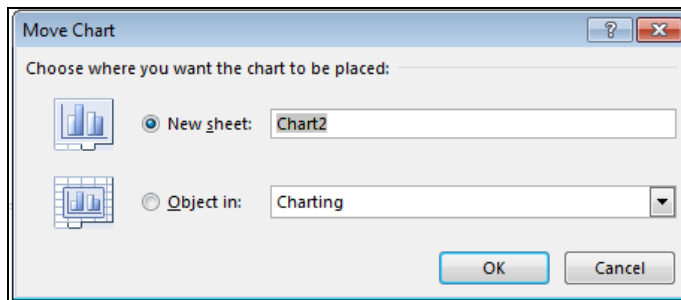
7. If you wish to add data labels (values to the graphs) / or add axis label, select the Design ribbon. (Keyboard shortcut: **ALT+JC**). Under the Chart Layouts group, select Add Chart Element. (Keyboard shortcut: **ALT+JC+A**). Select Data Labels.



In the chart, we will now add data labels. Select the position where you want the labels to be and click it.



If you want an entire tab dedicated to the chart, all you need to do is click on the Move Chart Command button located under the Design Ribbon. (Keyboard shortcut: **ALT+JC+V**). The chart will appear on a separate tab.



Tip: Set the background color and border color to “No Fill”, “No Line”. This helps in formatting if you paste the graph into Word or PowerPoint file.

Stock Price Charts

One of the most common forms of charts is a stock price chart. Stock price charts measure the performance of particular stocks and indices over a given period of time.

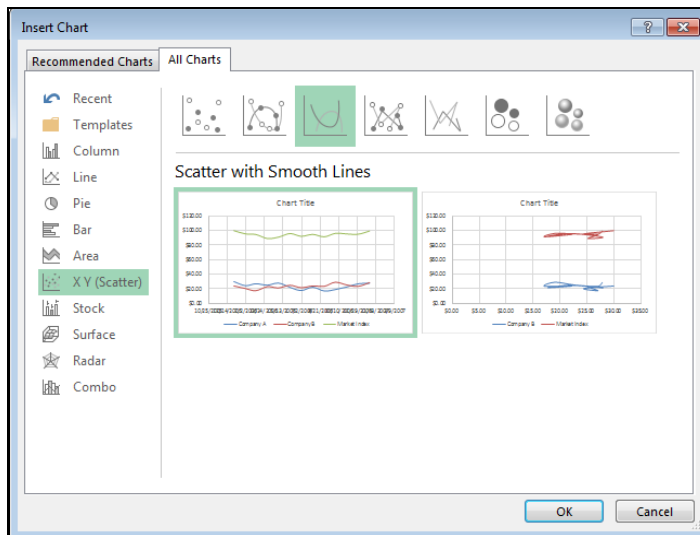
Creating the Chart

1. Select the data range to be charted. Include all data and labels in this range.

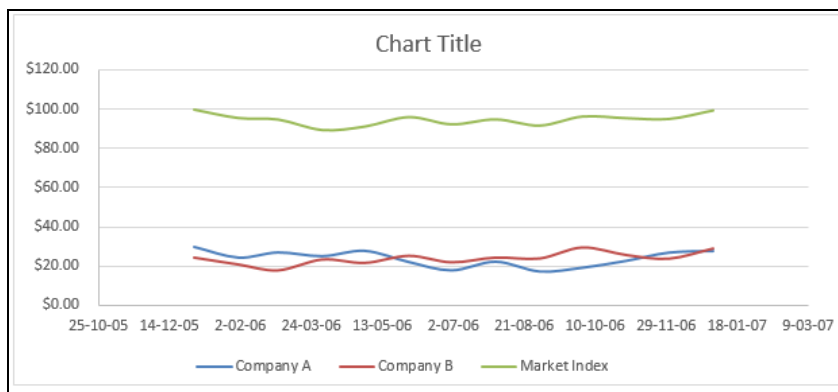
	A	B	C	D
1		Price Data		
2		Company A	Company B	Market Index
3	1/1/2006	\$30.00	\$24.00	\$100.00
4	2/1/2006	\$24.42	\$20.49	\$95.56
5	3/1/2006	\$27.11	\$17.48	\$94.76
6	4/1/2006	\$25.16	\$23.01	\$89.23
7	5/1/2006	\$27.95	\$21.30	\$91.05
8	6/1/2006	\$22.08	\$24.91	\$96.05
9	7/1/2006	\$17.72	\$21.61	\$92.23
10	8/1/2006	\$22.26	\$24.03	\$94.83
11	9/1/2006	\$17.12	\$23.56	\$91.57
12	10/1/2006	\$19.09	\$29.18	\$96.33
13	11/1/2006	\$22.73	\$25.31	\$95.49
14	12/1/2006	\$27.03	\$23.47	\$95.06
15	1/1/2007	\$27.88	\$28.67	\$99.55

2. As discussed earlier, to get all the available charts, go to *Insert* and select the arrow on the bottom right corner of the chart group. (Keyboard shortcut: **ALT+I+H** / **ALT+N+K**)

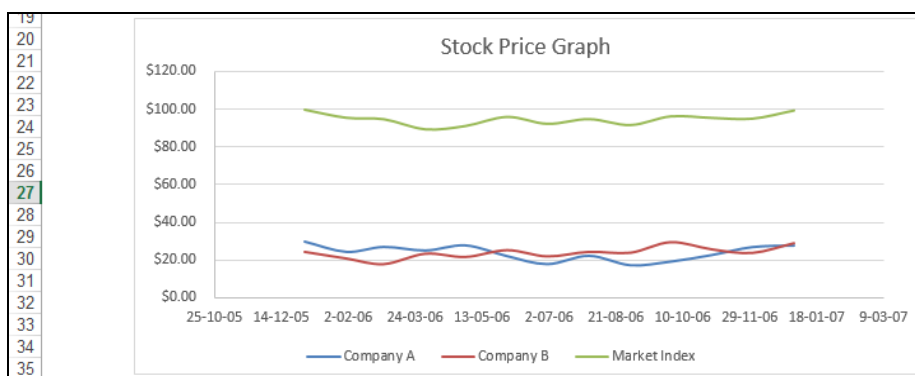
The following dialog box will appear:



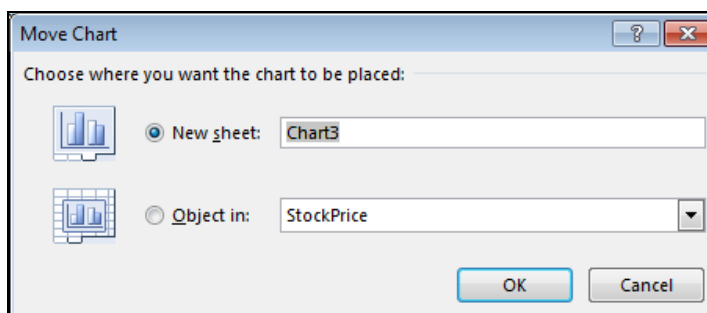
3. The chart will appear as follows:



4. Change the Chart Title to 'Stock Price Graph'. The graph should now look like this.



5. If you want to provide a chart in a separate sheet, click on *Design and Move Chart*.
The following dialog box will appear:



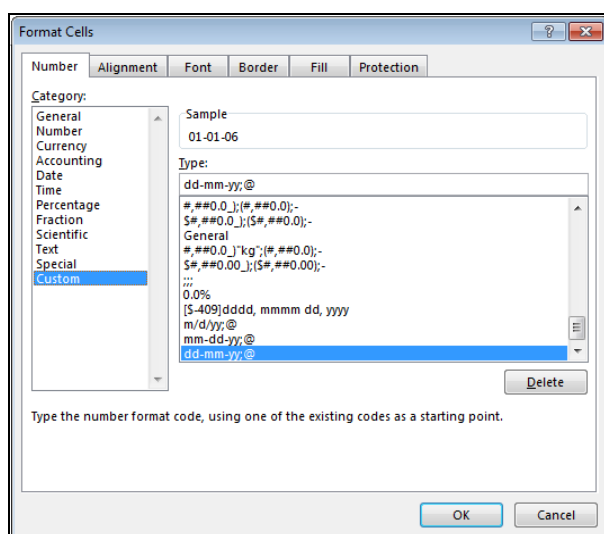
Click OK. You will now have an entire tab dedicated to the chart.

Formatting the Chart

The most common format correction we will need to make to the graph is to have the beginning and end dates on the x-axis correspond exactly to the range of data we are trying to graph. For this example the range is 1/1/06 to 1/1/07. In Excel, every date has a corresponding numerical value. The number 1 equals the date 1/1/1900.

1. To find out what number corresponds to our beginning and end date, reference the first and last dates in empty cells. Change the format of the referenced sales by selecting cells and pressing (**Ctrl+1 / ALT+H+FM**) or by choosing Home, then under Numbers submenu, click on the arrow button located in the bottom right hand corner.

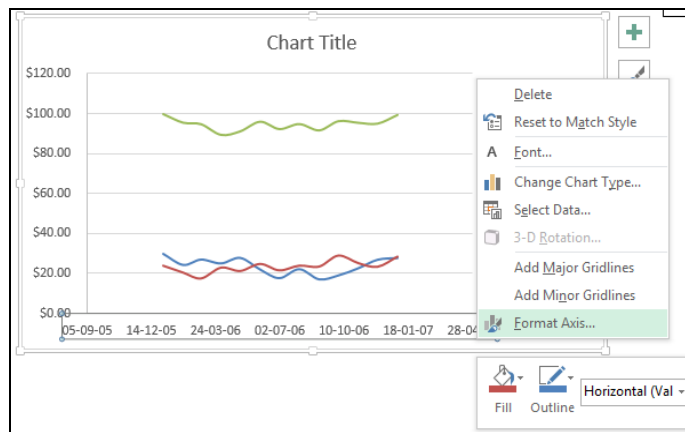
The following dialog box will appear. Select the format required and Click OK.



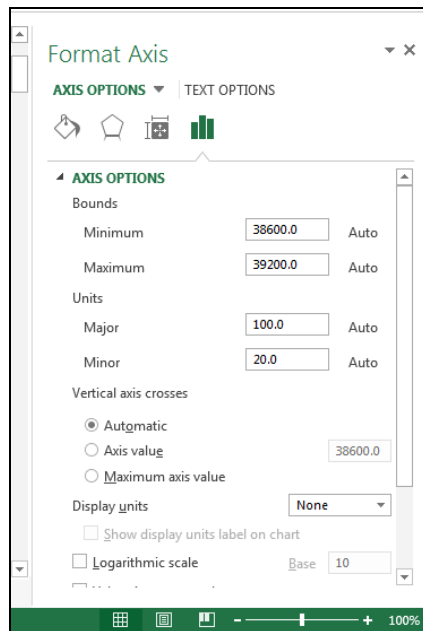
Once the format has been changed your output should look something like the following:

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

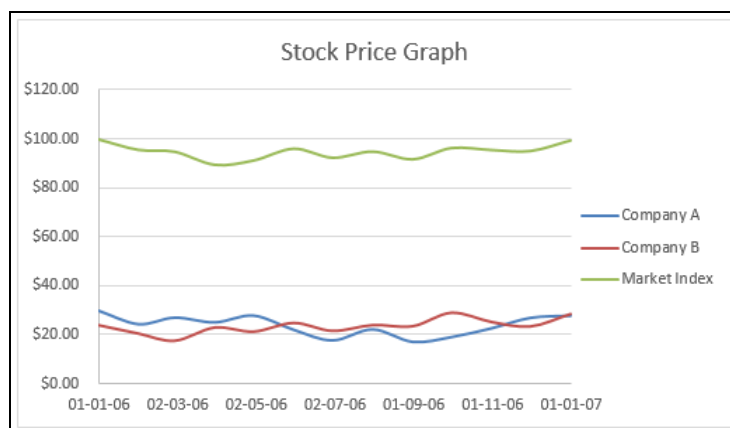
2. Right click on the x-axis and select **Format Axis**.



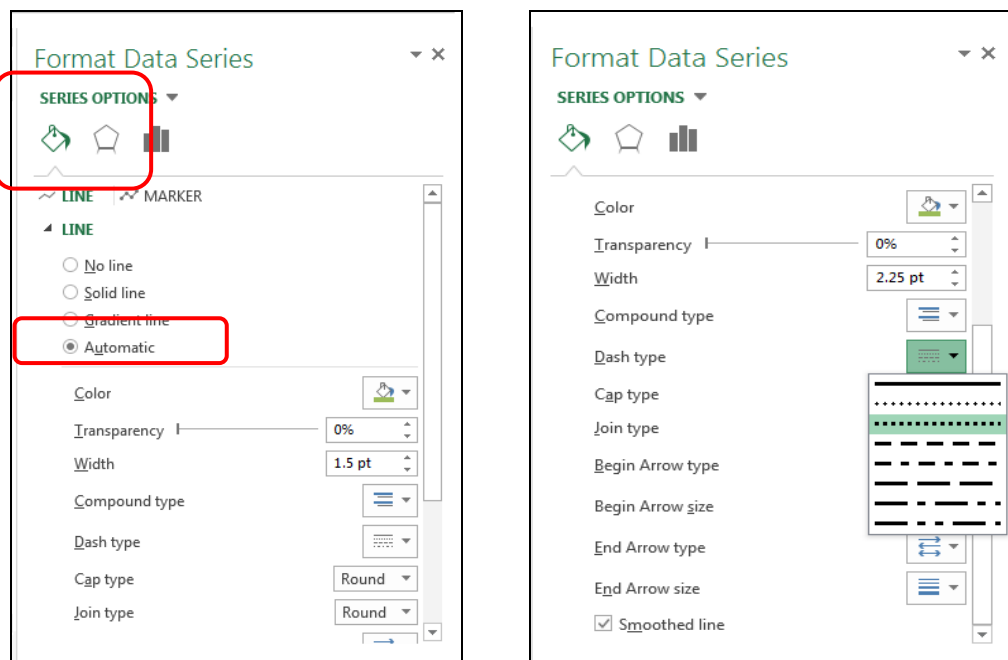
The following dialog box will appear on the right hand side of your screen:



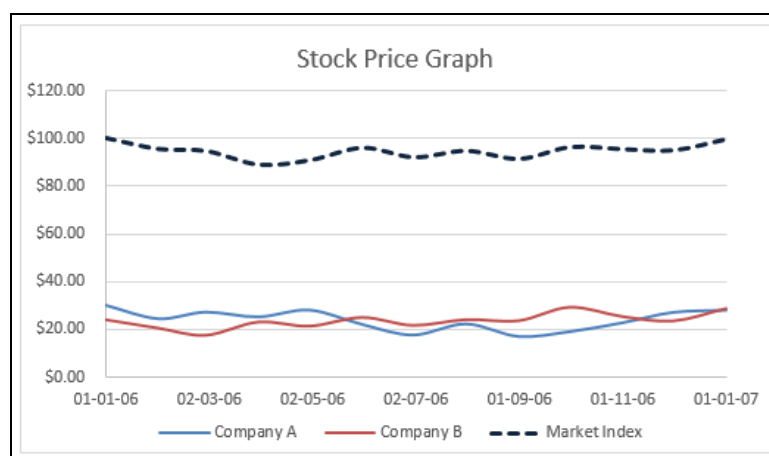
3. Input the correct **Minimum**, **Maximum**, and **Major Unit** figures by entering it into the adjacent text box using the values calculated above and click **OK**.
4. The graph should now look like the following:



5. Additional formatting that may be required would be (a) to format the date to make it fit (as is needed in the above chart), removing decimal points on the y-axis, (b) moving the legend to the bottom of the graph, removing the grid lines, (c) removing the gray background and (d) changing the format of the lines.
 - (a) The format of the labels in the graph will be the same as the format in the source data. You can either change the format in the source data or right click on the axis and Format Axis.
 - (b) Once you have already created the graph, to make format changes go to Design then under Add Chart Element select Legend. Under Legend menu select Show Legend at Bottom for the placement. Alternatively, you can click on the Legend and assign the place where you want the legend to be.
 - (c) Click on the green line and press **Ctrl+1** or go to Format then under shape styles select a list of available colors. After you press **Ctrl+1**, the following screen will be displayed on the right side. Select Solid line and then click on the fill box to select the desired color.
 - (d) You can change the format of the line under the same tab.



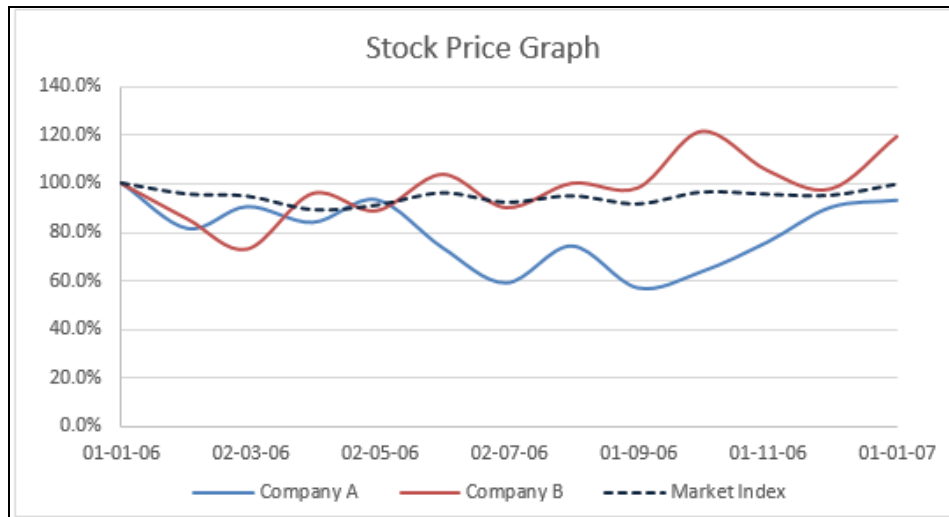
The graph should now look like the following:



Benchmarking the Chart

Benchmarked stock price charts compare the relative performance (percent change) of securities over a given time period. The value of each security is set at a value of 100% at the start date.

When the above graph is benchmarked it will look like the graph below:



Indexed Charts

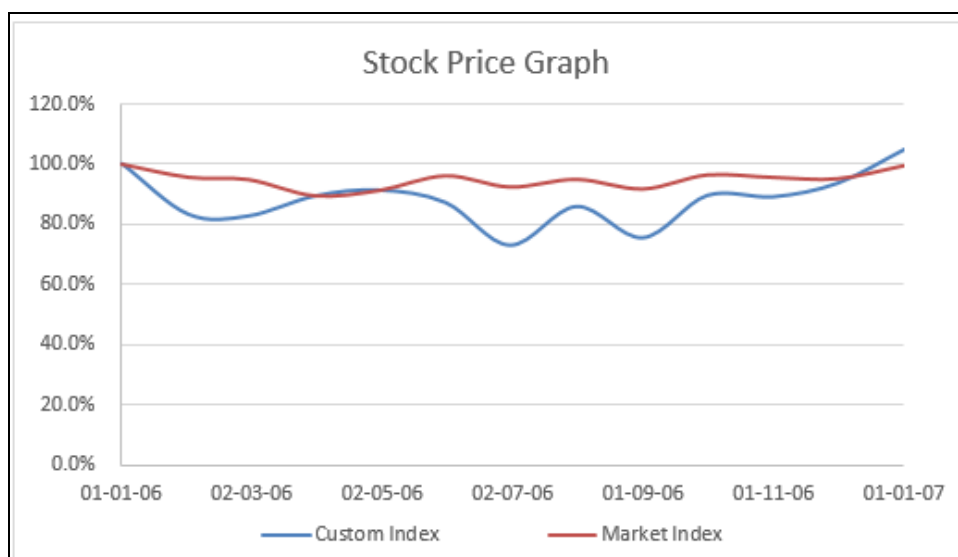
In addition to benchmarking individual stocks, you can create your own market index, or basket, of stocks to view/compare the relative performance of a group. For example, the S&P 500 is An index consisting of 500 stocks chosen for market size, liquidity and industry grouping, among other factors. The S&P 500 is designed to be a leading indicator of U.S. equities and is meant to reflect the risk/return characteristics of the large-cap universe. You may want an index of just automobile manufacturers to show the performance of that industry segment. As a practical matter, you may have a client that wants to know how his portfolio of stocks is performing as a whole.

There are two methods to creating indices:

(i) **Market Capitalization Weighted:** A stock market index weighted by the market capitalization of each stock in the index. In such a weighting scheme, larger companies account for a greater portion of the index. Most indexes are constructed in this manner, with the best example being the S&P 500.

(ii) **Price Weighted:** A stock index in which each stock influences the index in proportion to its price per share. The value of the index is generated by adding the prices of each of the stocks in the index and dividing them by the total number of stocks. Stocks with a higher price will be given more weight and, therefore, will have a greater influence over the performance of the index.

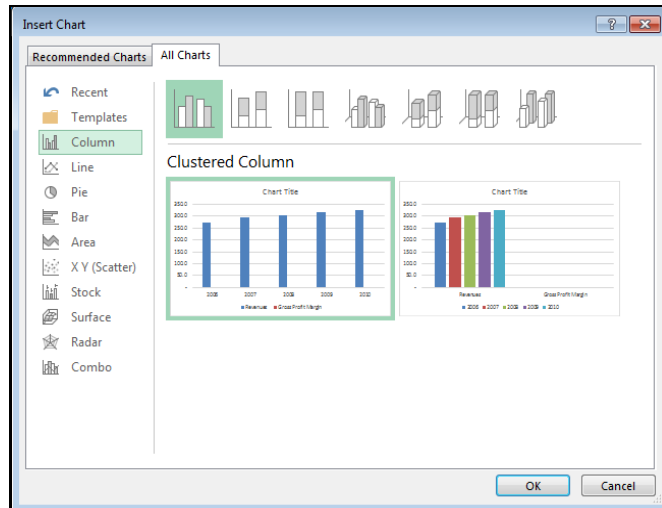
In, the previous example, if Company A and Company B create a price-weighted index the graph would look like the following:



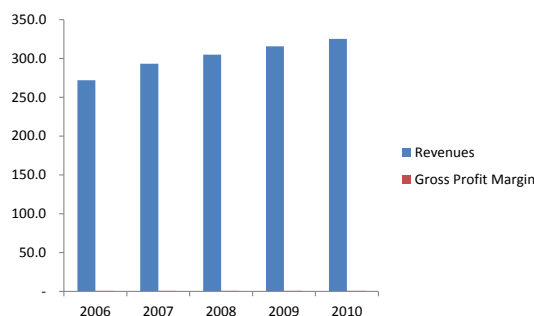
Two-Axis Bar Chart

Now, you have to represent two pieces of data in a single chart, with both representing independent source of data, but mutually dependent on one another. For instance, in the above examples, we were representing only a single data (such as revenues). Let's make this chart more meaningful by also showing gross profit margins.

1. Select the required data and insert a 2D column chart (clustered column)

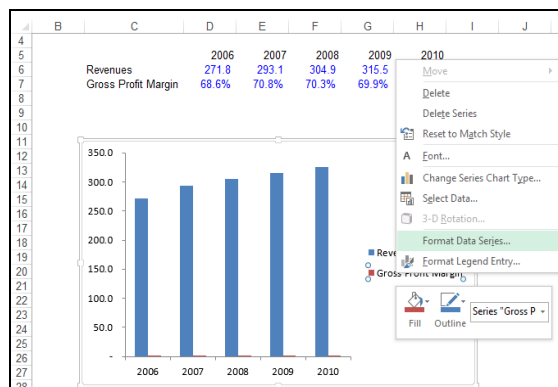


The chart now looks like this (After removing the border and fill).

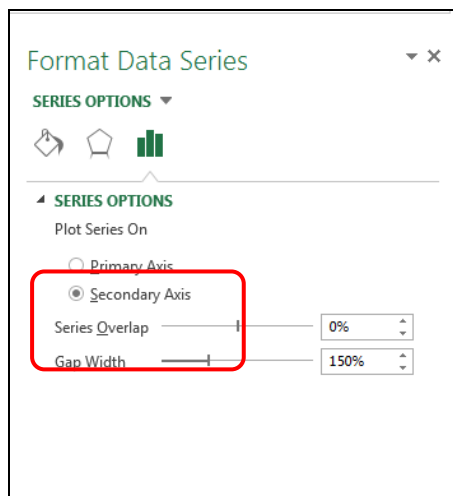


Now, the gross profit margin (in red), is not displayed as its data points are different since the revenues are in 100's and gross profit margins are in %. Since, we can't represent Gross Profit Margin on the same axis, we will now represent Gross Profit Margin on a different axis (called Secondary axis).

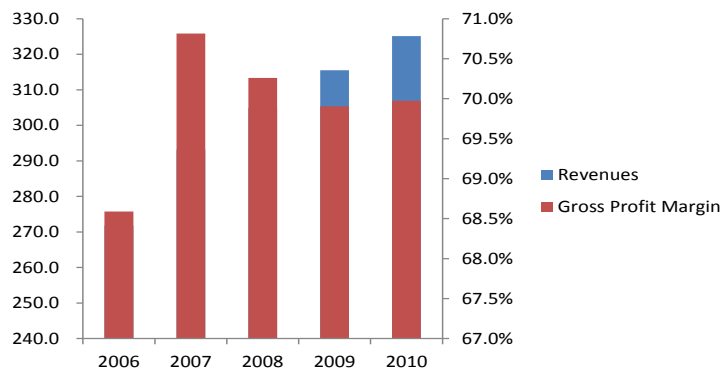
2. Right Click on the Gross Profit Margin Legend and select Format Data Series.



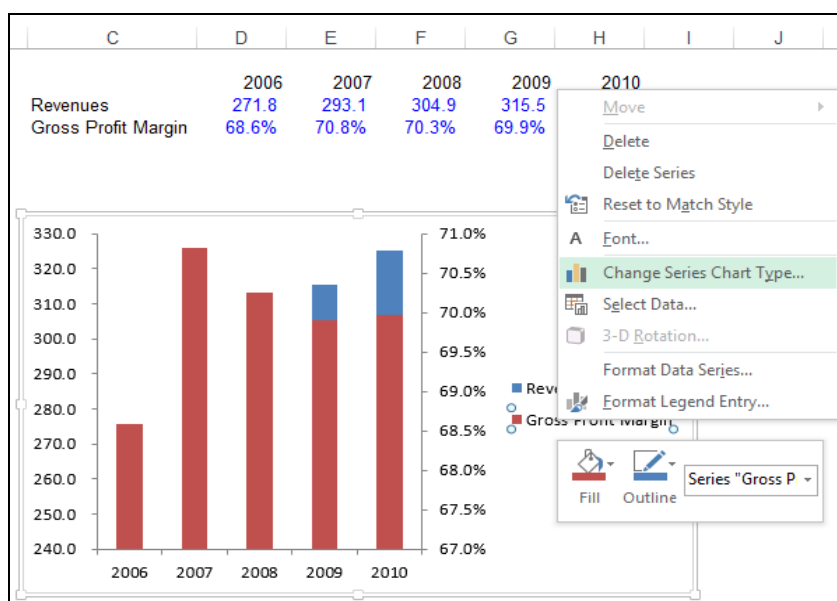
3. The following window will appear on the right side of the screen. Select the radio button on Secondary Axis.



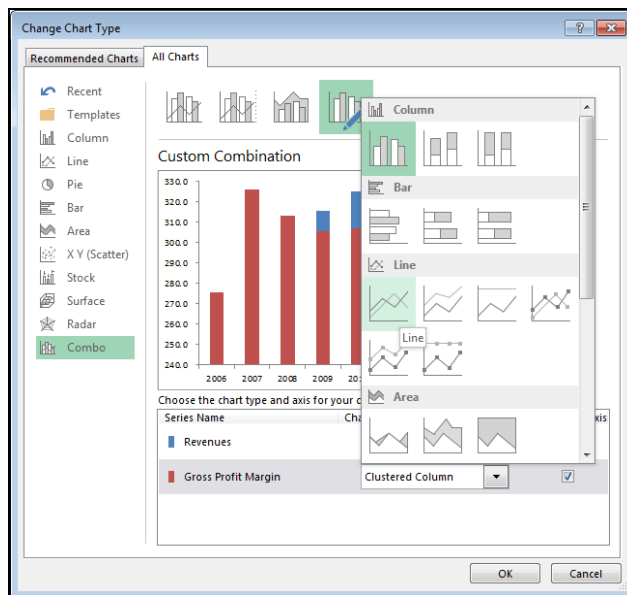
4. The following window will appear.



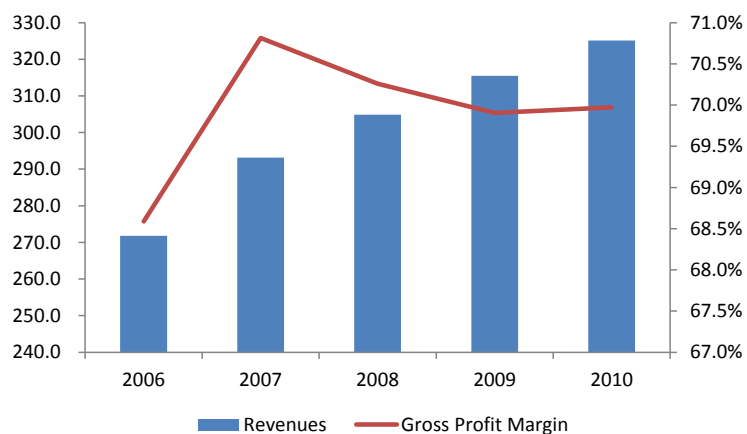
5. Once again, click on Gross Profit Margin legend and select Change Series Chart type.



6. Change the chart type to line.



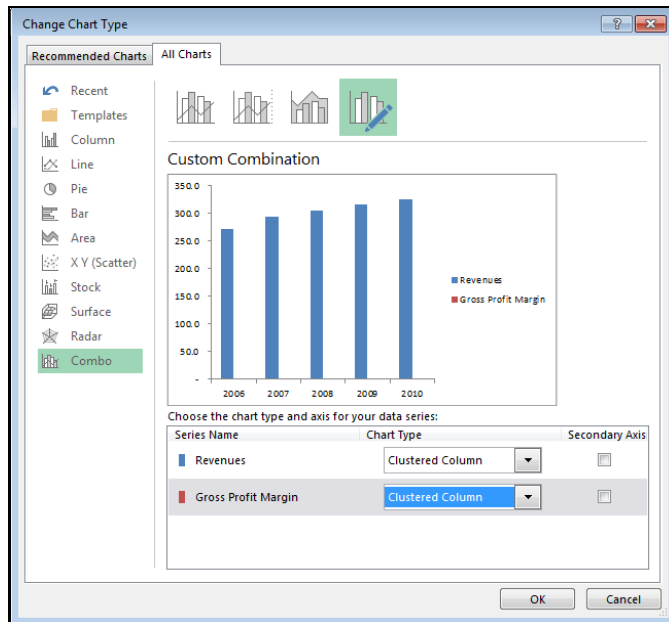
7. The chart looks like this after shifting the legend to the bottom and adding data labels.



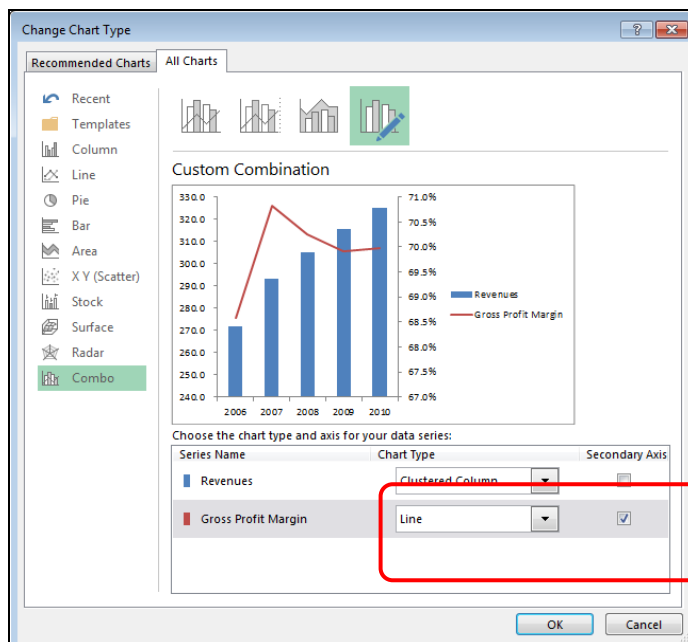
Alternatively, you can create the same chart using the Design tab.

1. Select the chart and click on Change Chart Type under the Design tab. Select Combo under All Charts tab. (Keyboard shortcut: **Alt+JC+C**).

The following window will appear:



2. You can now edit the chart type for both the series 'Revenue' and 'Gross Profit Margin' using the dropdown box provided.
3. Select Gross Profit Margin to be on the Secondary Axis by checking the box.



Sparklines

Sparklines represent trends or variations in collected data. Sparklines are tiny graphs generally about the size of the text that surrounds them. In Excel 2013, sparklines are the height of the worksheet cells whose data they represent and can be any of the following chart types:

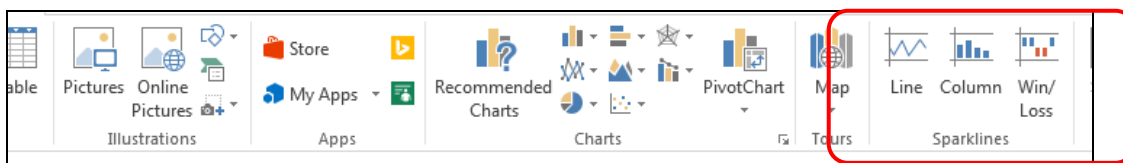
1. Line that represents the relative value of the selected worksheet data.
2. Column where the selected worksheet data is represented by tiny columns
3. Win/Loss where the selected worksheet data appears as a win/loss chart; wins are represented by blue squares that appear above red squares (representing the losses).

Let's start with preparing a line sparkline.

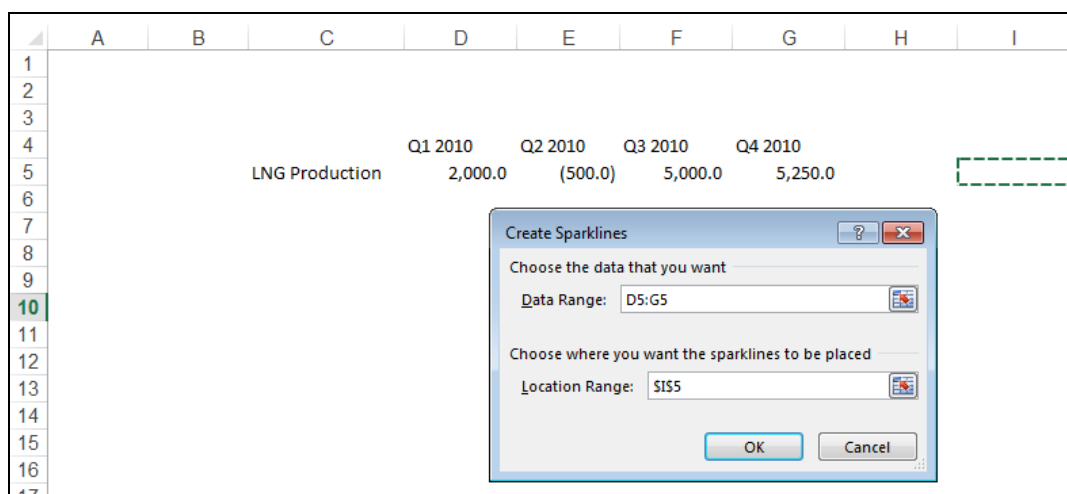
1. Select a data range which we will make a chart range of. Unlike charts where we select the labels, sparklines don't require them to be included as they will just give a pictorial representation of the values of the graph.

	A	B	C	D	E	F	G
1							
2							
3							
4				Q1 2010	Q2 2010	Q3 2010	Q4 2010
5			LNG Production	2,000.0	(500.0)	5,000.0	5,250.0
6							

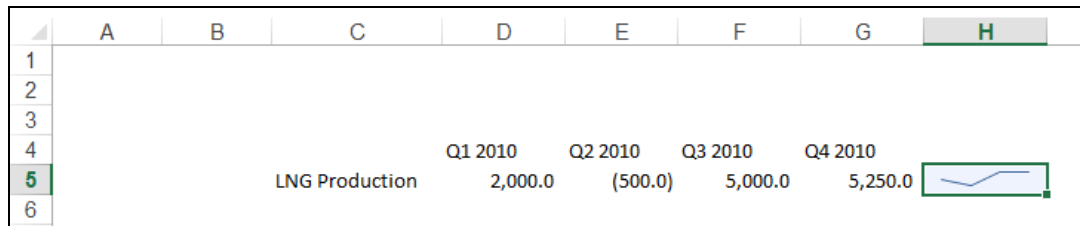
2. Select the sparkline to be made; in this case we will take the line sparkline which is the most appropriate. (Keyboard shortcut: **ALT+N+SL**).



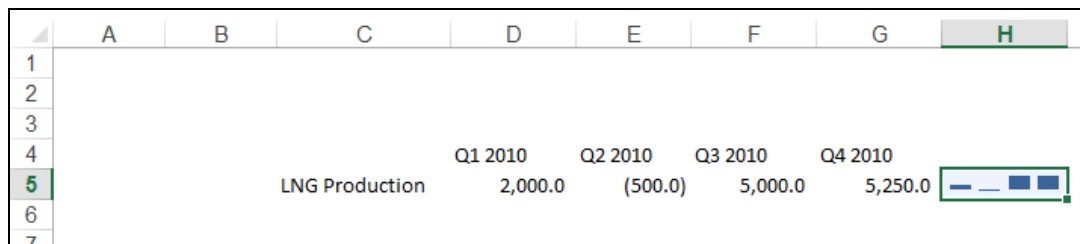
As soon as you click on line, you will find the following window.



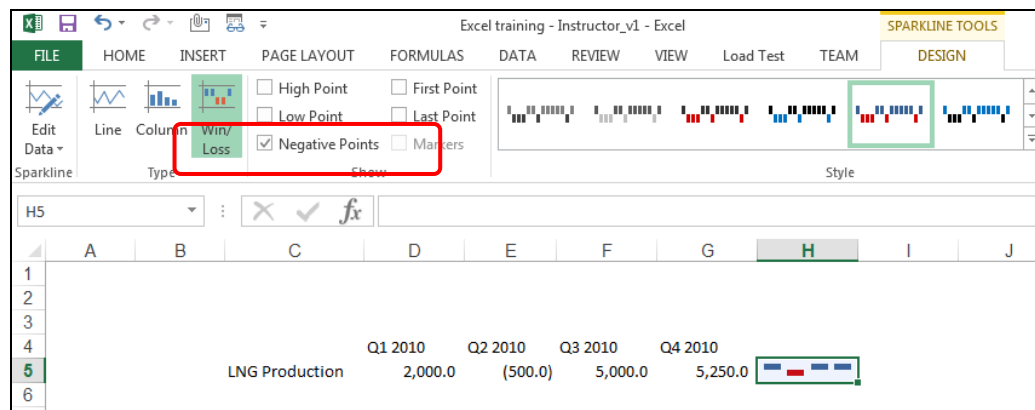
- If the Data range is automatically selected, it is essential that you cross check it. Moving along, select the location of the cell where you would like to put in the sparkline. Ideally, you should prepare the sparkline adjacent to the last cell of the values. Here, we will prepare it at 'H5'.



Similarly, we can select the column sparkline (Keyboard shortcut: **ALT+N+SL**) and repeat step2.



For Win/loss sparkline, input the following data and follow step 2 again. Notice that if you have a negative figure the cell shows red color, indicating something negative about the figures. This can be viewed only when the check box for Negative Points is checked under the Design Tab.



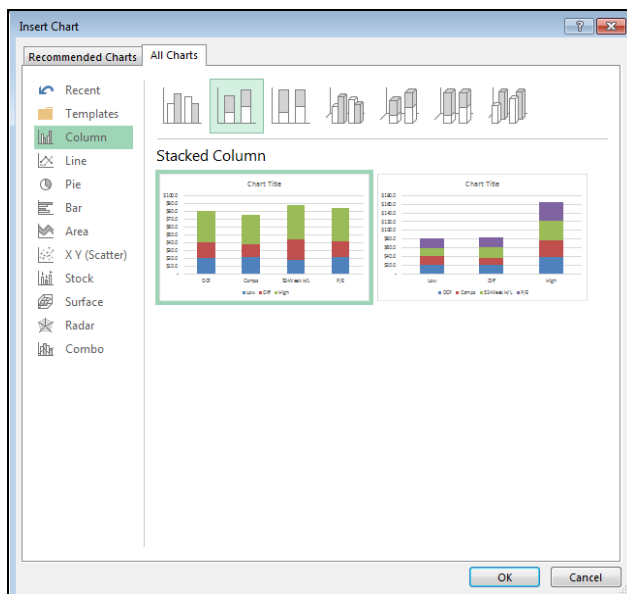
Floating Bar Charts

Floating Bar Chart is one of the ways of comparing different valuation techniques to value the company in the form of charts. It provides a snapshot of the valuation range suggested by each of the techniques used.

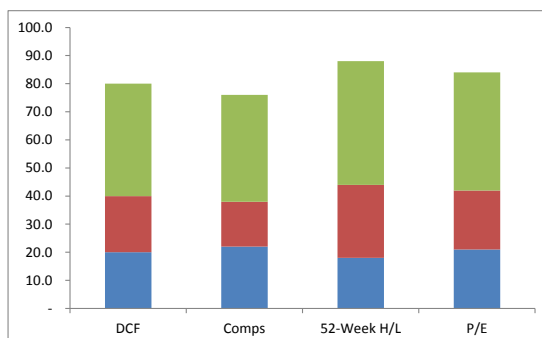
1. **Data:** To create a floating bar chart, three data items are required, in this order: Low-Difference-High. The Low and High suggest the range of the valuation technique. The Difference is a calculation. (High – Low). Select the entire data range including the data labels.

	A	B	C	D	E
1					
2					
3		Valuation	Low	Diff	High
4		DCF	\$20.0	=+E3-C3	\$40.0
5		Comps	\$22.0	16.0	\$38.0
6		52-Week H/L	\$18.0	26.0	\$44.0
7		P/E	\$21.0	21.0	\$42.0

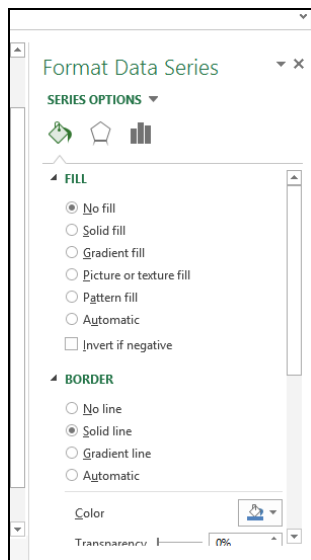
2. **Creating the Chart:** After selecting the data range, click on the Chart Icon (or **Alt+I+H**) and select chart type 'Column' and the Chart sub-type 'Stacked Column' which is 2nd chart from the left. Click on OK and Finish the Chart.



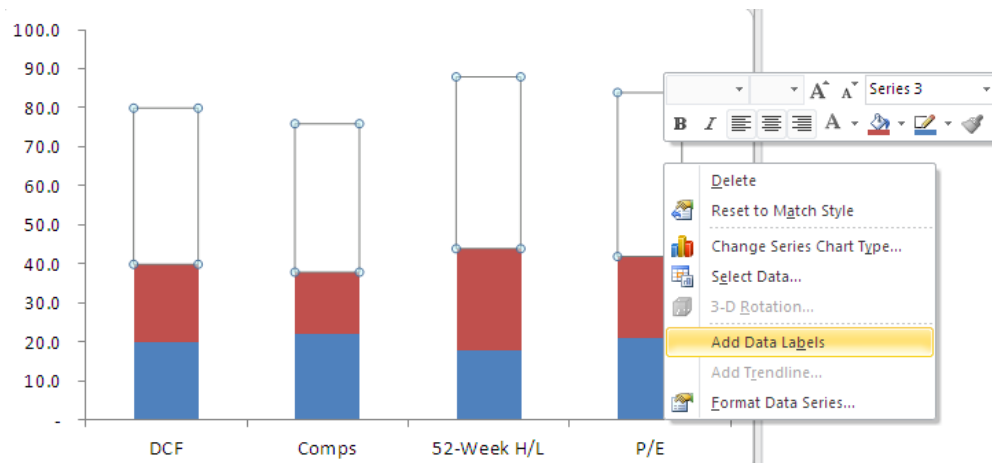
3. **Formatting the Chart:** Formatting the chart is the most important step of creating the floating bar chart. Once the chart is created remove the gridlines, plot area, and legend. Also format the Chart Area to remove the background and border. The Chart looks like this:



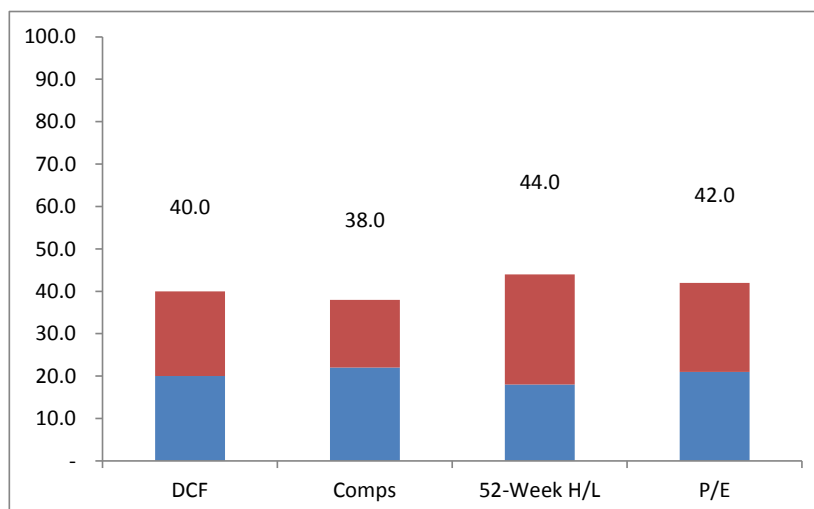
- Double click the top series (High – Green) to open Format Data Series box on the right hand side of the screen. In the Border Color, select No Line and No Fill in the Fill Menu (shown below). Click on Close.



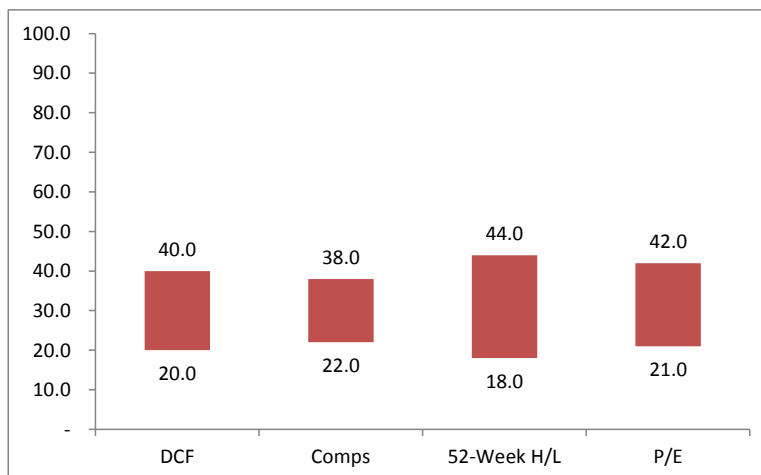
- Right Click on the bar again (no color) and select Add Data Labels.



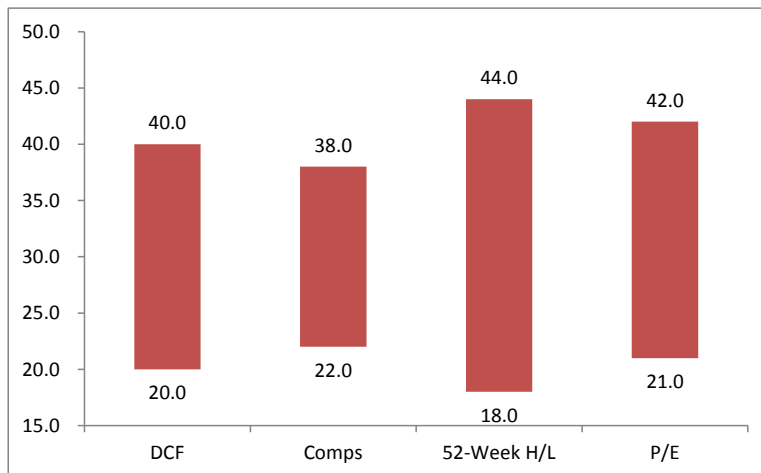
- The resulting chart will look like this.



- Repeat steps 4 and 5 for the Low Series as well. Only remember to position the data labels to Inside End (not Inside Base). Now the Chart looks like this:



- Rescale the Y Axis to fit the chart. Double Click on the Y Axis and in the Scale tab enter the Minimum and Maximum scale. Now the chart looks bigger and more legible.

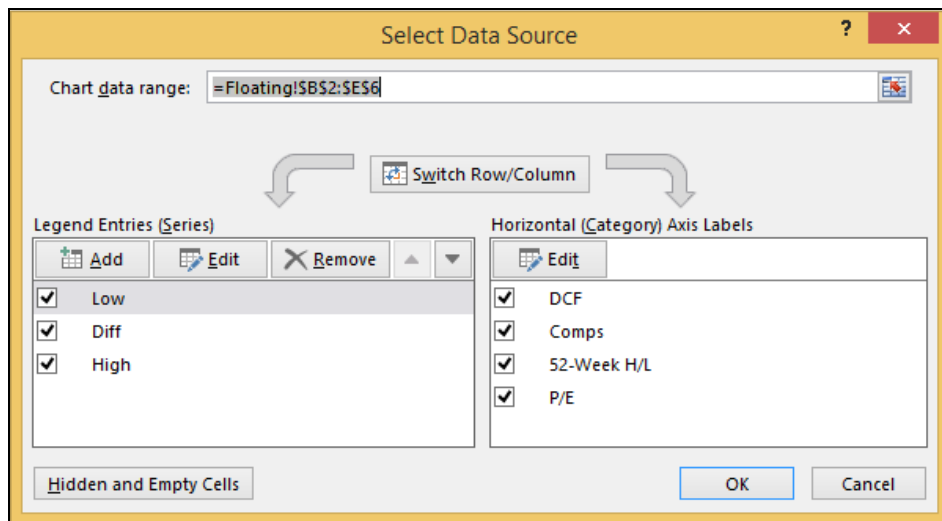


Add the Current Price Line

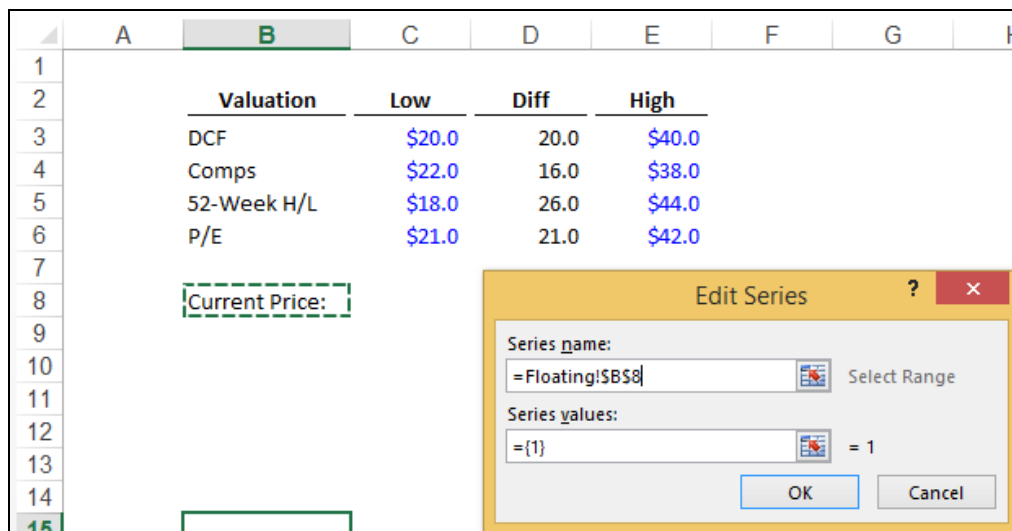
- Enter the Current Price in a cell and label it. For example, enter the price in D8 and the label 'Current Price' in B8

	A	B	C	D	E
1					
2		Valuation	Low	Diff	High
3		DCF	\$20.0	20.0	\$40.0
4		Comps	\$22.0	16.0	\$38.0
5		52-Week H/L	\$18.0	26.0	\$44.0
6		P/E	\$21.0	21.0	\$42.0
7					
8		Current Price:		\$25.0	
9					

- Right Click on the Chart and open the Select Data Source dialog box. Click on Add.

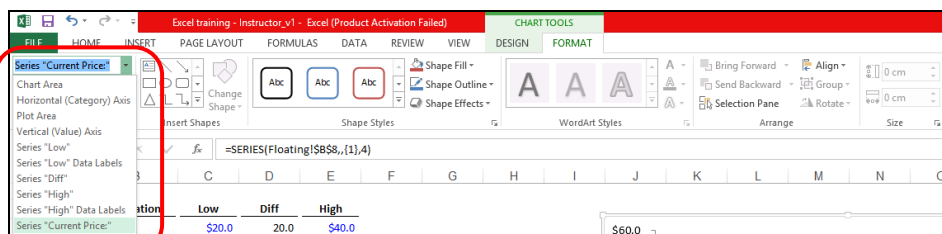


- After you click on Add, enter cell reference to Name. In this example it will be B8. Then click on OK.

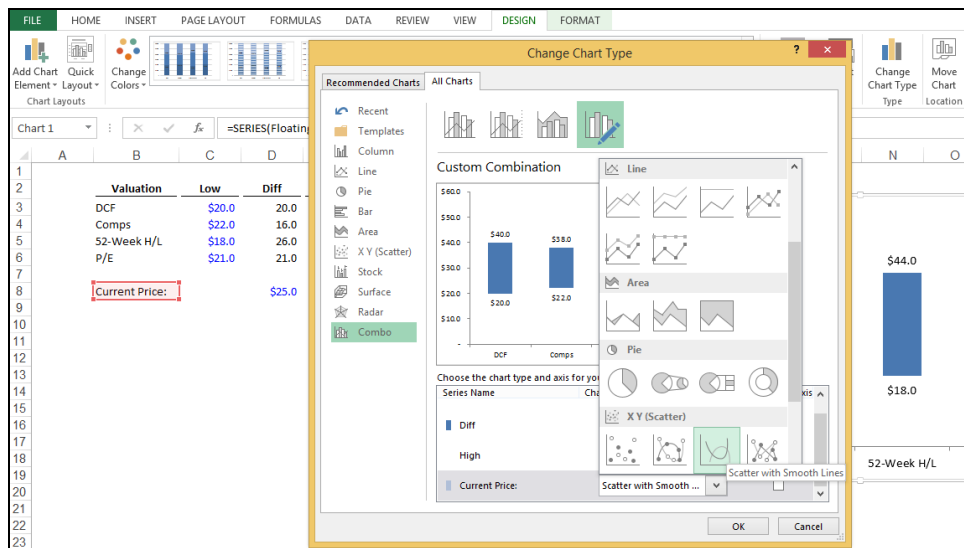


Change the Chart Type for the New Series

- This will add a Series to our existing Chart. All you need to do is go to Format Tab and select Series "Current Price" located at the leftmost corner of the ribbon. The new series will not be visible on the Chart as yet.

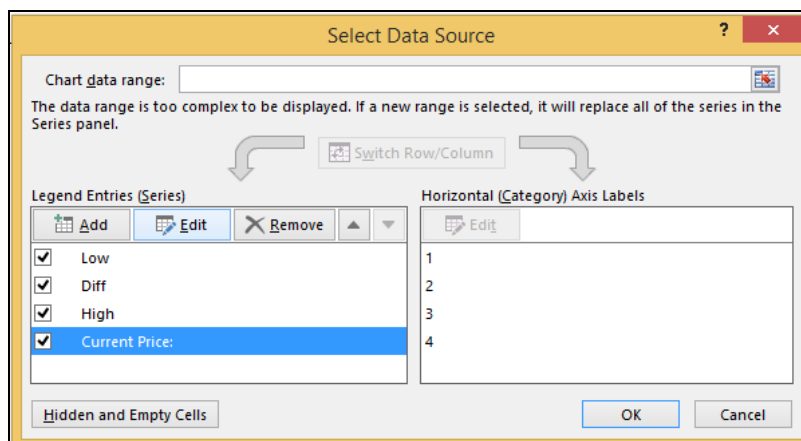


5. Immediately go to the Design Tab and click on Change Chart Type. Select XY Scatter Chart.

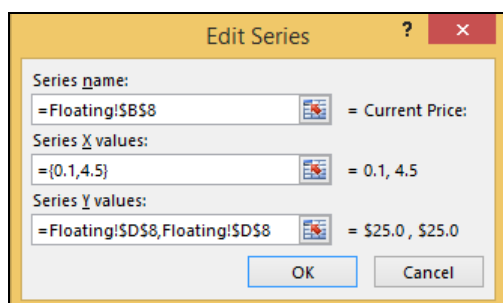


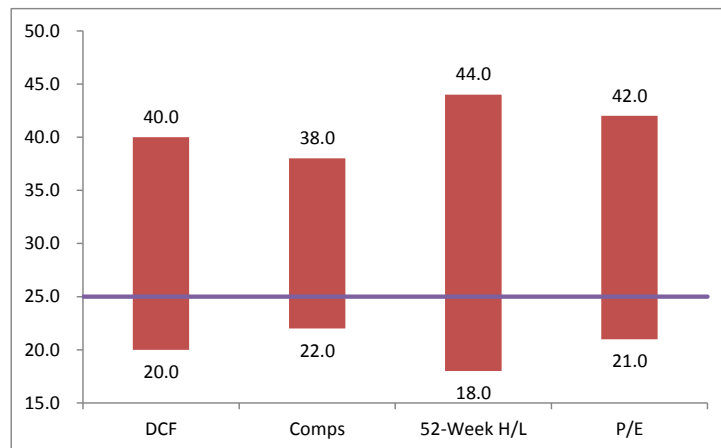
Assigning Values to the Line

6. Now, right click on the chart and go to Select Data, Series tab. Select the Series Current Price and press Edit.

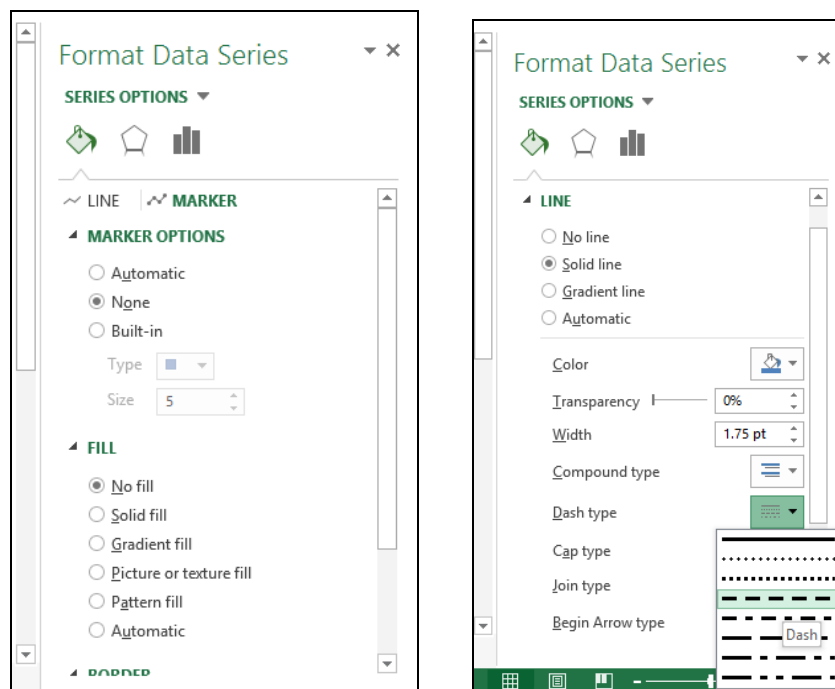


7. For X Values, enter $=\{0.1,4.5\}$. This tells the scatter line to start at 0.5 on the X Axis and extend to 4.5. Ideally, it should have started with 0, but since Excel 2010 recognizes this as one of the elements of the chart, we assign it as 0.5. The 4.5 depends on the number of valuation techniques shown in the chart. So if there are 5 valuation techniques in the chart, enter $=\{0.1,5.5\}$. Also remember, since these are numbers plugged in, they need to be embedded in curly brackets.
8. For Y Values, cell reference it to the Current Price cell, in this example D8. Therefore, enter $=\text{Sheet1!}\$D\$8, \text{Sheet1!}\$D\8 . The reason for entering the same value twice is to keep the line straight across the Y Axis. Once you enter the values the chart will appear as below. It is almost complete, almost!

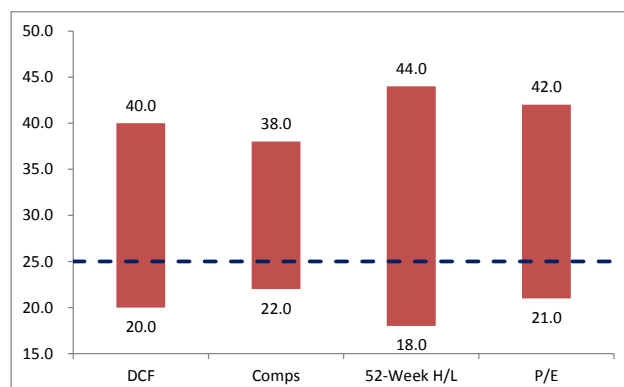




9. You still need to format the blue line to make it look appropriate. Right click on the blue line and Select Format Data Series. You will see the following options. Marker option should be set to None. Go to Line Color and then select Solid Fill and select the blue color. After that please select Line Style and select the dotted dash types.

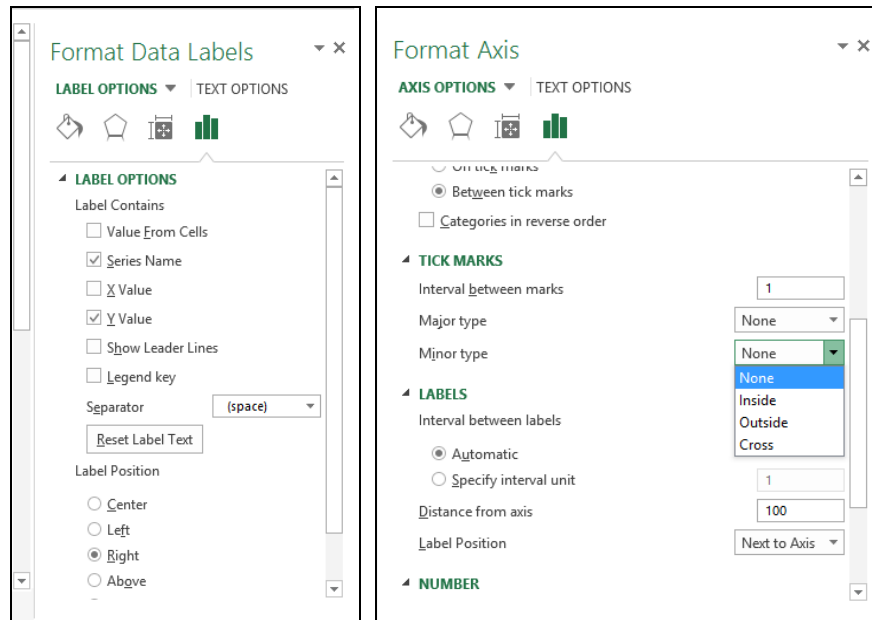


Your chart will now look like this.

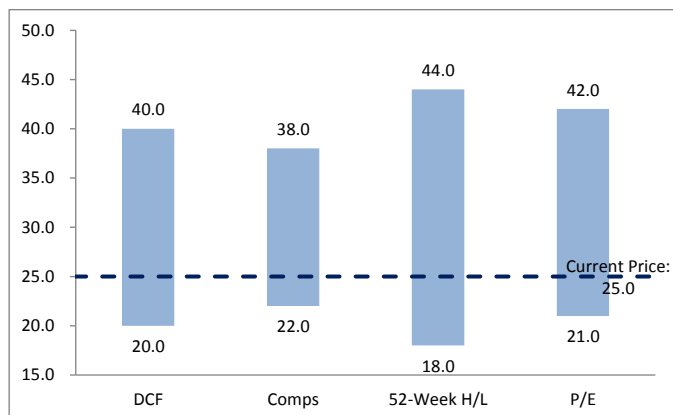


Final Touches!

10. Now that the line is visible, right click on the line and select add data labels. Right click on the line again and select Format Data Labels. The following window will appear. Select Series Name and Y Values. Also select Space in the Separator. This is shown below.
11. Format the bars by changing the color. Also remove the tick marks from the axes (shown below).



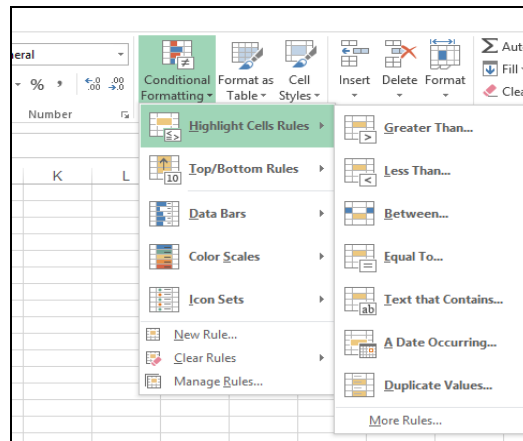
12. Voila, the chart is client ready!



Conditional Formatting

The Conditional Formatting button enables you to apply provisional formatting to a cell range based solely on the categories into which its current values fall. The cool thing about this kind of conditional formatting is that should you edit the numbers in the cell range so that their values fall into other categories, the program automatically changes their cell formatting to suit.

When you click the Conditional Formatting button in the Styles group of the Home tab, a drop-down menu appears with the following options:



- Highlight Cells Rules opens a continuation menu with various options for defining formatting rules that highlight the cells in the cell selection that contain certain values, text, or dates; that have values greater or less than a particular value; or that fall within a certain ranges of values.
- Top/Bottom Rules opens a continuation menu with various options for defining formatting rules that highlight the top and bottom values, percentages, and above and below average values in the cell selection.
- Data Bars opens a palette with different color data bars that you can apply to the cell selection to indicate their values relative to each other by clicking the data bar thumbnail.
- Color Scales opens a palette with different two and three-colored scales that you can apply to the cell selection to indicate their values relative to each other by clicking the color scale thumbnail.
- Icon Sets opens a palette with different sets of icons that you can apply to the cell selection to indicate their values relative to each other by clicking the icon set.
- New Rule opens the New Formatting Rule dialog box where you define a custom conditional formatting rule to apply to the cell selection.
- Clear Rules opens a continuation menu where you can remove conditional formatting rules for the cell selection by clicking the Clear Rules from Selected Cells option, for the entire worksheet by clicking the Clear Rules from Entire Sheet option, or for just the current data table by clicking the Clear Rules from This Table option.
- Manage Rules opens the Conditional Formatting Rules Manager dialog box where you edit and delete particular rules as well as adjust their rule precedence by moving them up or down in the Rules list box.

	A	B	C	D	E	F
1						
2						
3						
4		6	3	6	6	
5		5	3	5	5	
6		4	3	4	4	
7		3	3	3	3	
8		2	2	2	2	
9		1	1	1	1	
10		2	2	2	2	
11		3	3	3	3	
12		4	3	4	4	
13		5	3	5	5	
14		6	3	6	6	
15						

Data Tables

Tables automatically fill in a grid with values. The following sample fills the table with revenue values.

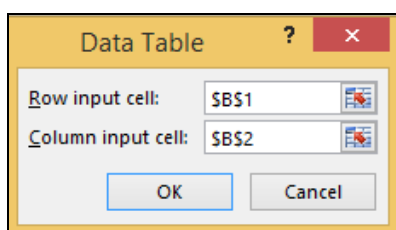
Creating a Data Table:

1. Select a blank cell to be a substitution for row values.
2. Select a blank cell to be a substitution for column values.
3. Select a blank cell that will contain the formula including the two substitution cells.
4. In row directly to the right of the formula cell, enter the desired values.
5. In the column directly, below the formula cell, enter the desired values. The table should now appear as follows:

	A	B	C	D	E	F	G	H
1	Units Sold Cell							
2	Price per Unit Cell							
3	Formula Input Cell	0	1,000	1,500	2,000	2,500	3,000	
4		\$15						
5		\$30						
6		\$45						
7		\$60						
8		\$75						
9		\$90						
10		\$105						
11		\$120						
12								

*Note: In this example, the formula in cell B3 is B1*B2. No values or labels will appear in cells B1 and B2.*

6. Select the table including the formula cell and all values.
7. Click on Data, under Data Tools, click on What If Analysis and select Data Table. (Keyboard shortcut: **ALT+D+T** / **ALT+A+W+T**). The following dialog box will appear:



8. The Row input cell is the substitution cell for the row. In this case, cell B1.
9. The Column input cell is the substitution cell for the column. In this case, cell B2.
10. Click on OK, then press F9 to recalculate the spreadsheet. The output should appear as follows:

	A	B	C	D	E	F	G	H
1	Units Sold Cell							
2	Price per Unit Cell							
3	Formula Input Cell	0	1,000	1,500	2,000	2,500	3,000	
4		\$15	\$15,000	\$22,500	\$30,000	\$37,500	\$45,000	
5		\$30	\$30,000	\$45,000	\$60,000	\$75,000	\$90,000	
6		\$45	\$45,000	\$67,500	\$90,000	\$1,12,500	\$1,35,000	
7		\$60	\$60,000	\$90,000	\$1,20,000	\$1,50,000	\$1,80,000	
8		\$75	\$75,000	\$1,12,500	\$1,50,000	\$1,87,500	\$2,25,000	
9		\$90	\$90,000	\$1,35,000	\$1,80,000	\$2,25,000	\$2,70,000	
10		\$105	\$1,05,000	\$1,57,500	\$2,10,000	\$2,62,500	\$3,15,000	
11		\$120	\$1,20,000	\$1,80,000	\$2,40,000	\$3,00,000	\$3,60,000	
12								

Data tables require a significant amount of computer processing power and when they are included in a larger file, they can recalculate very slowly, slowing you down.

One way to address this is to set your options so that Excel does not recalculate tables unless you hit F9. To do this go to **File**, **Options**, and **Formulas**. Under **Calculation**. Choose **Automatic except tables**.

Another way is to paste values on top of the table, effectively deleting the table. To paste values, copy cells C4:G11 then go press **E+S** and select **V** and click **OK**. You can create a Macro to create the data table and then write over the data with values so you won't have to recreate the data table every time.

Macros

What is a Macro?

A macro is a set of recorded commands that can be played back four ways:

1. Through the **Macro/Run** command. (**ALT+W+M**)
2. Through a shortcut key.
3. Through a custom button.
4. Through clicking an area on a graphic object

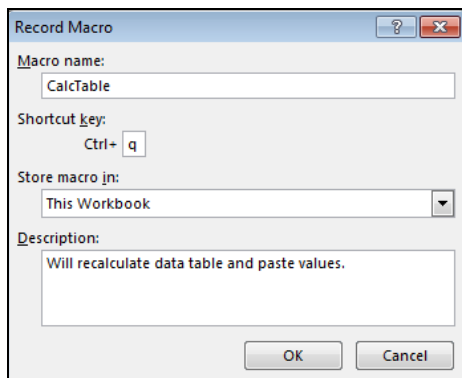
Creating a Macro:

If the Developer tab is not available, do the following to display it:

1. Click the File tab, click Options, and then click the Customize Ribbon category.
2. In the Main Tabs list, select the Developer check box, and then click OK.
3. To set the security level temporarily to enable all macros, do the following:
 - On the Developer tab, in the Code group, click Macro Security.
 - In the Macro Settings category, under Macro Settings, click Enable all macros (not recommended; potentially dangerous code can run), and then click OK.

Create a Macro

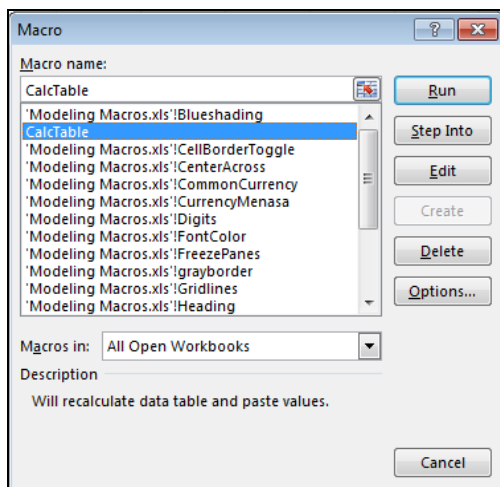
1. Click on Developer, then click on **Record Macro** located at the top left corner. (Keyboard shortcut : **ALT+T+M+R** / **ALT+L+R**)
2. Select **Record New Macro**. The following dialog box will appear:



3. Type a macro name. The name can be only one set of consecutive characters; however, upper and lower case letters can separate words.
4. Create a shortcut key that will launch the macro when completed.
5. Type a description.
6. Click on the drop-down arrow in the Store macro in field to store the macro in the following:
 - Personal macro workbook** – macro will appear in all open workbooks
 - This workbook** – macro will appear in only the active workbooks.
 - New workbook** – macro will appear only in new workbooks.
7. Click on OK. The Stop Rec toolbar will appear on the spreadsheet. The first icon stops the macro from recording. The second icon toggles between Absolute and Relative Reference mode. There are two types of macros – absolute and relative. An absolute macro will be played back only in the cells where it was originally created. A relative macro will be played back in the active cell.
8. When the Stop Rec toolbar is visible, the macro recorder records every keystroke and mouse click until the recorder is turned off. After completing all steps to recording the macro, click on the **Stop Recorder** icon in the Code group.

Running a Macro from the Macro/Run Command:

1. Click on **Deve**l_op_er, then **Macros**. (Keyboard shortcut: **ALT+L+PM**). The following dialog box will appear:



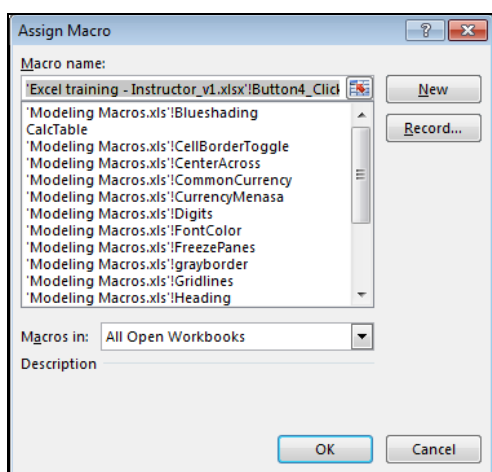
2. Select the macro to run.
3. Click on the **R**un button

Running a Macro from the Shortcut Keys:

1. Press the shortcut keys chosen when the macro was originally recorded.

Running a Macro Using a Custom Button:

1. Click on **Deve**l_op_er and click on **I**ns_ert.
2. Select **B**uttons, and then click **O**K.
3. Drag the mouse pointer over area where button is to be placed.
4. Right click on the button and select **A**ssign **M**acro. The following dialog box will appear:

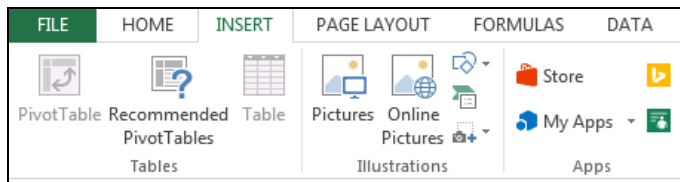


5. Select the macro to be run when the button is depressed.
6. Click on **O**K.
7. In the button, type over the words **Button #** with the new button name.
8. Click anywhere outside the button.
9. Click on the button to run the macro.

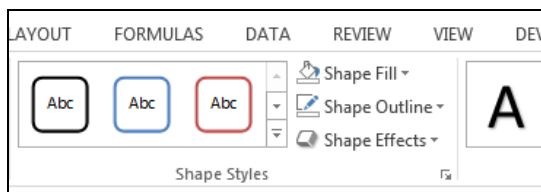
*Note: To copy or move the button, hold the **CTRL** key and click on the new button.*

Run a macro by clicking an area on a Graphic Object

1. In the worksheet, insert a graphic object, such as a picture, clip art, shape, or SmartArt.
2. To create a hot spot on the existing object, on the Insert tab, in the Illustrations group, click Shapes, select the shape that you want to use, and then draw that shape on the existing object.



3. Right-click the hot spot that you created, and then click **Assign Macro**.
4. Do one of the following:
 - To assign an existing macro to the graphic object, double-click the macro or enter its name in the Macro name box.
 - To record a new macro to assign to the selected graphic object, click Record, type a name for the macro in the Record Macro dialog box, and then click OK to begin recording your macro. When you finish recording the macro, click Stop Recording on the Developer tab in the Code group.
 - To edit an existing macro, click the name of the macro in the Macro name box, and then click Edit.
5. Click OK.
6. In the worksheet, select the hot spot. This displays the Drawing Tools, adding a Format tab.
7. On the Format tab, in the Shape Styles group, click the arrow next to Shape Fill, and then click No Fill.



8. Click the arrow next to Shape Outline, and then click No Outline.

Building a Print Macro:

Overview:

- Step 1: Define Named Ranges
Step 2: Create the Macro
Step 3: Create the Worksheet Button (optional).

Creating the Macro

1. Select Developer, Visual Basic. (**ALT+L+V**)
2. In the Visual Basic Editor, select **Insert**, then **Module**
The following example creates a macro for the named range “Matrix”.
3. Type the following text (exact syntax):
Sub PrintMatrix()
Range(“Matrix”).PrintOut
End Sub.
4. Close out of the Visual Basic Editor (**F**ile, then **C**lose).

Working with Spreadsheets

Linking Spreadsheets in a Workbook:

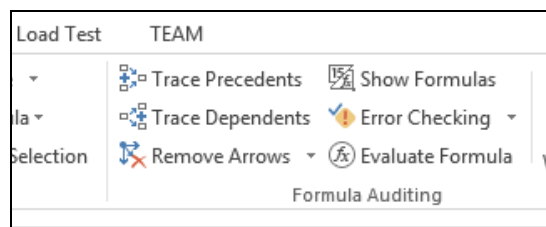
1. Click on the spreadsheet tab where the formula will be placed. This is the spreadsheet that will be updated.
2. Click in the cell where the formula will be placed. This is the cell that will be updated.
3. Press the “=” sign.
4. Click on the spreadsheet tab where the data is coming from to make it active.
5. Click in the cell containing the source data.
6. Press **ENTER**.

The Auditor:

The auditor traces dependent and precedent formulas and values showing where data is either coming from or going to.

Using the Auditor:

1. Click on **Formulas**, then **Formula Auditing**.



Tracing Dependents or Precedents

1. Click on the cell where the trace is to begin.
2. Click on the Trace Precedents (Keyboard Shortcut: **ALT+M+P**) or Trace Dependents (Keyboard Shortcut: **ALT+M+D**) icons for each level of formulas to be traced.

Example of Trace Precedents:

	A	B	C	D
1	Tax=	8.25%		
2		Sales	Tax on Sales	Selling Price
3	JAN	\$5,000.0	\$412.5	\$5,412.5
4	FEB	\$10,000.0	\$825.0	\$10,825.0
5	MAR	\$15,000.0	\$1,237.5	\$16,237.5
6	APR	\$20,000.0	\$1,650.0	\$21,650.0
7	MAY	\$25,000.0	\$2,062.5	\$27,062.5
8	JUN	\$30,000.0	\$2,475.0	\$32,475.0
9	JUL	\$35,000.0	\$2,887.5	\$37,887.5
10	AUG	\$40,000.0	\$3,300.0	\$43,300.0
11	SEP	\$45,000.0	\$3,712.5	\$48,712.5
12	OCT	\$50,000.0	\$4,125.0	\$54,125.0
13	NOV	\$55,000.0	\$4,537.5	\$59,537.5
14	DEC	\$60,000.0	\$4,950.0	\$64,950.0
15	TOTALS	\$390,000.0	\$32,175.0	\$422,175.0
16				

Example of Trace Dependents:

	A	B	C	D	E
1	Tax=	8.25%			
2		Sales	Tax on Sales	Selling Price	
3	JAN	\$5,000.0	\$412.5	\$5,412.5	
4	FEB	\$10,000.0	\$825.0	\$10,825.0	
5	MAR	\$15,000.0	\$1,237.5	\$16,237.5	
6	APR	\$20,000.0	\$1,650.0	\$21,650.0	
7	MAY	\$25,000.0	\$2,062.5	\$27,062.5	
8	JUN	\$30,000.0	\$2,475.0	\$32,475.0	
9	JUL	\$35,000.0	\$2,887.5	\$37,887.5	
10	AUG	\$40,000.0	\$3,300.0	\$43,300.0	
11	SEP	\$45,000.0	\$3,712.5	\$48,712.5	
12	OCT	\$50,000.0	\$4,125.0	\$54,125.0	
13	NOV	\$55,000.0	\$4,537.5	\$59,537.5	
14	DEC	\$60,000.0	\$4,950.0	\$64,950.0	
15	TOTALS	\$390,000.0	\$32,175.0	\$422,175.0	
16					

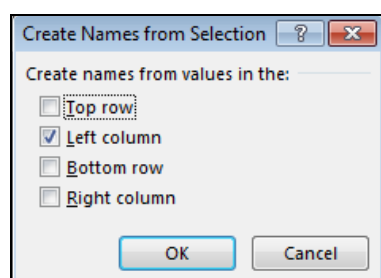
Creating a Range Name:

The following example will create range names and make the PMT formula easier to read.

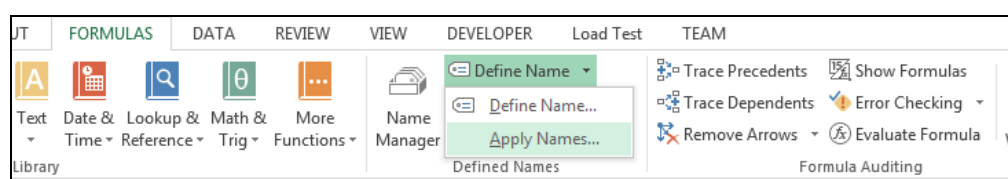
	A	B	C	D	E	F
1		Monthly Payment =	(\$696.26)	=PMT(D2/12,D3*12,D4-D6,D5,D7)		
2		Interest Rate:		10%		
3		Number of Periods:		30		
4		Present Value:		\$100,000.00		
5		Future Value:		\$0.0		
6		Down Payment		\$20,000.0		
7		Type:		1		
8						
9		For the Type:				
10		Use "0" if Payment is at the end of the period				
11		Use "1" if Payment is at the Beginning of the Period.				
12						

Notice the formula in cell C1.

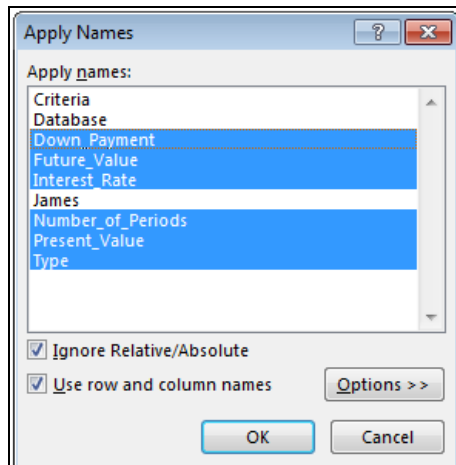
1. Select the cells containing the labels and values.
 2. Click on **Formulas**, **Create from Selection** under the **Defined Names** Command button.
- The following dialog box will appear:



3. Select where the names are in relation to the values. The default is normally correct.
4. Click on OK.
5. Click on the cell where the formula is located.
6. Click on the arrow located at the bottom right corner of **Define Name** and under that click on **Apply Names**.



The following dialog box appear:



Select the names to be applied to the formula. The default is normally correct.

7. Click on OK.

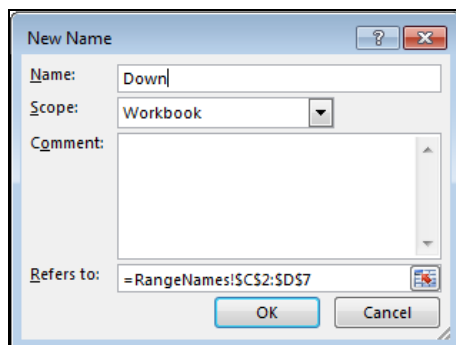
The new formula appears as:

*=PMT(INTEREST_RATE/12,NUMBER_OF_PERIODS*12,PRESENT_VALUE-DOWN_PAYMENT,FUTURE_VALUE,TYPE)*

Creating a Range Name Other Than the Default

1. Select the cells containing the labels and values.
2. Click **Formulas**, **Define Name** → **Define Name**. (Keyboard shortcut: **ALT+M+M+D**).

The following dialog box will appear.



3. Type "Down" and then OK.

Databases

What is a Database?

A database is a set of related information; i.e.: an address book or an employee listing. A database consists of fields and records. Fields are groups of related data. A record is a set of fields. For example, The Department of Motor Vehicles has a record of you if you have a driver's license. The record is comprised of fields with your name, address, telephone number, date of birth, class of license and license number.

Creating Fields:

Fields are labels describing related information

Name	Address	Phone
------	---------	-------

The more fields in a database, the more control there will be on the output. When a sort, find or extraction is performed, the user has more options to control the information that is going to be effected by the command. There is more control over the following example than the previous one.

FirstName	LastName	Street	City	State	Zip	AreaCode	Phone
-----------	----------	--------	------	-------	-----	----------	-------

Note: Each field name must be unique! A database can not have two field names that are the same. Field names must also be in adjacent columns. Do not skip columns!

Creating Records:

Records are sets of information beneath field names; for example:

FirstName	LastName	Street	City	State	Zip	AreaCode	Phone
John	Doe	123 Main St.	New York	NY	10016	212	555-1234
Jane	Smith	456 Broadway	Anytown	NJ	07700	908	555-6543
Joe	Jackson	543 South St.	Sometown	PA	45862	215	555-1237

Fields

Records

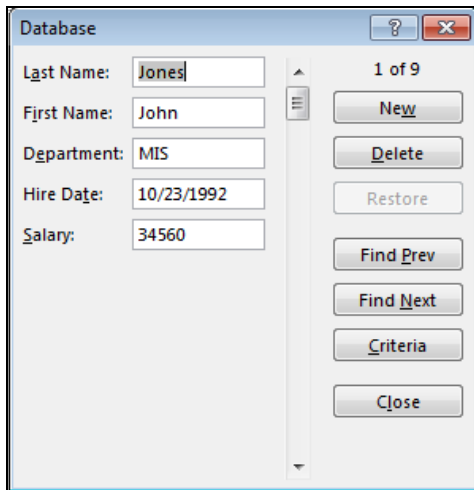
Using Forms to Add Records to the Database:

Before we begin, we require customizing the ribbon, so that we can access the database.

In Office 2013, by default you will not see the Form option when you click on Data. For this you will be required to customize the ribbon. Follow the steps below:

1. Click on File and then Options.
 2. Go to Customize Ribbon.
 3. Select All Commands from the drop-down menu of "Choose Commands From".
 4. Select Form on the list of available buttons.
 5. In the same window, under Customize the Ribbon, select Main tab (located on the top right corner), then select Data and click on New Group.
 6. Select Form (from the available buttons) and press Add and ensure that the New Group (Custom) is highlighted.
 7. Press OK.
-
1. Add the required fields in the Excel.
 2. Click in any cell within the database. (Fields include Last Name, First Name, Department, Hire Date and Salary)
 3. Click on Data, then Form.

The following dialog box will appear:

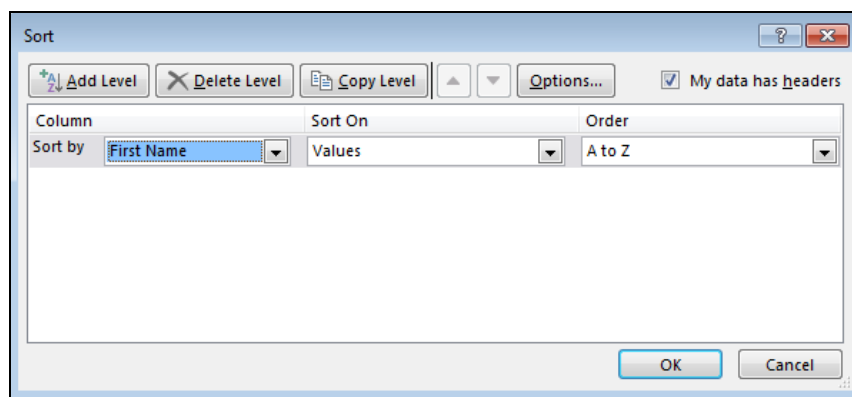


1. Click on **New** to add a new record.
2. Type new data. Use the Tab key to navigate forward through the fields. Use **Shift+Tab** keys to move backwards.
3. When finished entering new data, click on **Close**.

Sorting a Database:

Sorting organizes data in numerical or alphabetical order, ascending or descending; i.e. 12345, ABCDE, 54321, EDCBA. This sort is performed on the first character in each cell.

1. Click on any cell within the database.
 2. Click on **Data**, and then **Sort**. (Keyboard shortcut: **ALT+D+S/ALT+A+S+S**)
- The following dialog box will appear:



3. In the **Sort By** field, click on the drop-down list button to select a field to be sorted.
4. If desired, select a second field to be sorted. Click on **Add Level** to set the conditions.
5. Under **My List Has**, check mark **Header Row** (if it is applicable) to prevent your field names from being sorted in your data.

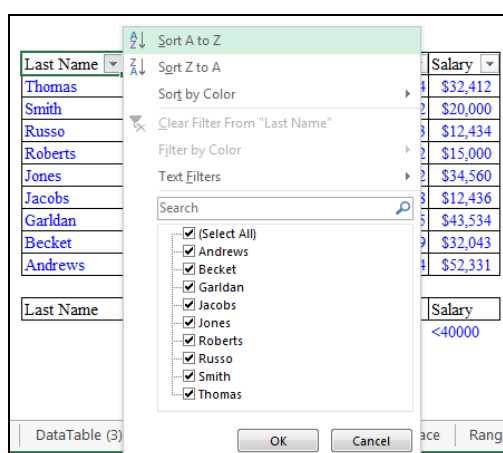
Note: For sorting the database in ascending order, you can directly sort it by pressing the shortcut **ALT+A+S+A**. Similarly for sorting in descending order, press **ALT+A+S+D**.

Using Filters to Extract Records:

1. Click on any cell within the database.
2. Click on **Data**, **F**ilter (under the tab Sort & Filter), then **F**ilter. (Keyboard Shortcut: **ALT+A+T**)
3. Control arrows will now appear to the right of every field name. These arrows will allow the user to control the extraction (search).

	Last Name ▾	First Name ▾	Department ▾	Hire Date ▾	Salary ▾
14	Thomas	Stacey	MIS	4/2/1994	\$32,412
15	Smith	Amanda	Finance	10/23/1992	\$20,000
16	Russo	Renee	Accounting	2/2/2003	\$12,434
17	Roberts	Max	IT	10/23/1992	\$15,000
18	Jones	John	MIS	10/23/1992	\$34,560
19	Jacobs	Mary	Cust. Service	5/15/1998	\$12,436
20					

4. Click on the control arrow in the field to be sorted. A drop down list will appear.



5. Click on a label to be searched. Only records that match this label will appear.

Viewing All Records After an Extraction:

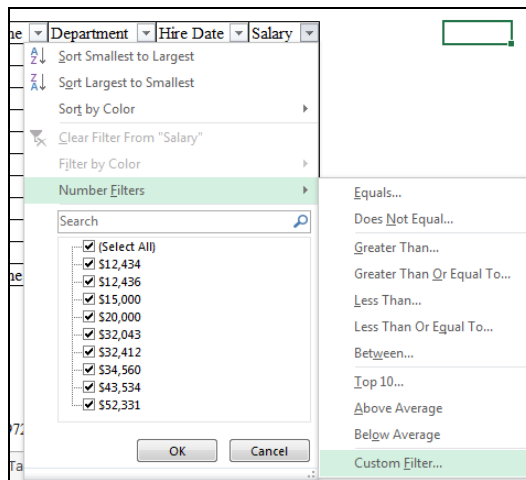
1. Click on any cell within the database.
2. Click on **Data** then **C**lear. (Keyboard shortcut : **ALT+A+C**)

Applying Custom Constraints:

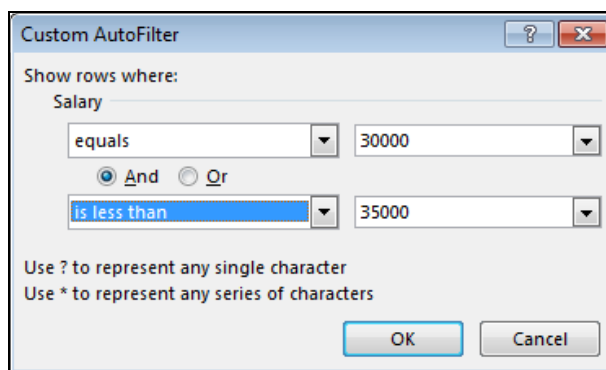
Custom constraints are used to find records that are within certain criteria; i.e.: employees earning between \$30,000 and \$40,000 per year.

Setting Custom Criteria

1. Click on the filter control arrow for the field to be sorted.
2. Depending whether the selected field contains numbers / alphabets you will automatically be given a drop down conditions to sort the data. Assuming you are sorting the salary of the employees, the below steps are to be followed.



3. Select (Custom Filter...). The following dialog box will appear:



4. Select the desired preferences.
5. Click OK.

Using a Criteria Range

This method is commonly used along with database function formulas; i.e.: **DCOUNT()**, **DSUM()**, **DMIN()**, **DMAX()** and **DAVERAGE()**

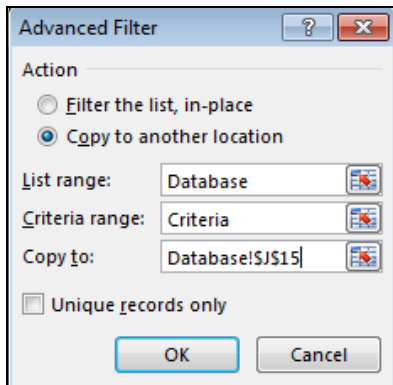
Setting Custom Criteria

1. Copy the field names to a blank area on the spreadsheet.
2. Type the constraints in the cells directly below; for example:

Last Name	First Name	Department	Hire Date	Salary
		MIS		<40000

3. Click on Data then under Sort & Filter click on Advanced. (Keyboard shortcut: (**ALT+A+Q**)).

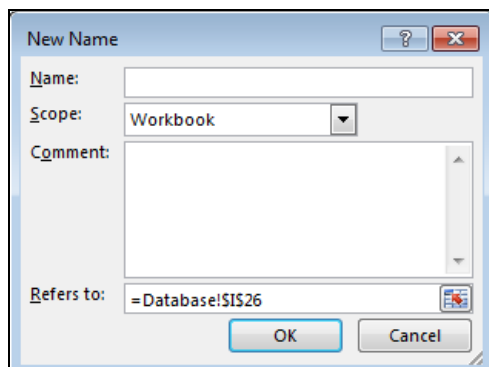
The following dialog box will appear:



4. Select **Copy to another location**. This will extract all records that meet the criteria to a range in either this or another worksheet.
5. Select the database as the **List range**. If the database range has been named, type the range name in the **List range** field.
6. Select the criteria as the **Criteria range**. (Select the fields and the condition.) If the criteria range has been named, type the range name in **Criteria range** field.
7. In the **Copy to** field, type the first cell where the new data is to be placed. Note: The data extracted will write over existing data. Be sure the copy range is blank before the extraction.
8. Click on **OK** to extract records.

Naming the Database and Criteria Ranges

1. Select the database or criteria range
2. Press **ALT+M+M+D** or (**Ctrl+F3**).
The following dialog box appears:



3. Click on **New**
4. Type the name **Database** or **Criteria** in the **Names in workbook** field.
5. Click on **OK**.

Some Database Function Formulas:

DCOUNT(Database,Field,Criteria)

Will return the number of records that match the criteria set

DSUM(Database,Field,Criteria)

Will add all records that match the set criteria

DMIN(Database,Field,Criteria)

Will return the lowest value form the records that match the set criteria

DMAX(Database,Field,Criteria)

Will return the highest value form the records that match the set criteria

DAVERAGE(Database,Field,Criteria)

Will return the average of all records that match the set criteria

SUBTOTAL Command

The subtotal command returns a subtotal in a list or database. It is generally easier to create a list with subtotals by using the Subtotal command in the Outline group on the Data tab. Once the subtotal list is created, you can modify it by editing the SUBTOTAL function.

The syntax of the command is :

= *SUBTOTAL*(function_num,ref1,[ref2],...)

function_num = The number 1 to 11 (includes hidden values)

1= average,2= count.

Consider the following example.

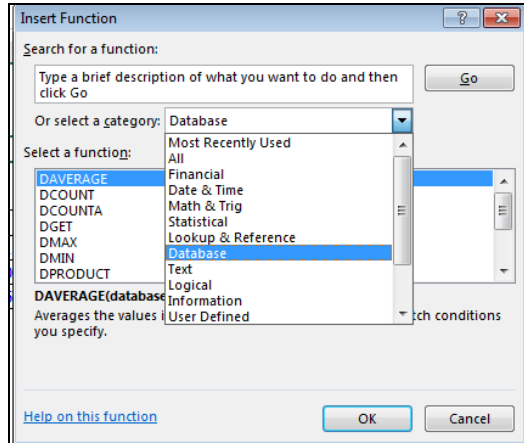
Last Name ▾	First Name ▾	Department ▾	Hire Date ▾	Salary ▾	
Thomas	Stacey	MIS	4/2/1994	\$32,412	
Smith	Amanda	Finance	10/23/1992	\$20,000	
Roberts	Max	IT	10/23/1992	\$15,000	
Jones	John	MIS	10/23/1992	\$34,560	
Garldan	Mandi	Marketing	6/3/1995	\$43,534	
Becket	Tony	Finance	7/3/1999	\$32,043	
Andrews	Kurt	Advertising	3/9/2004	\$52,331	
				7.0	=SUBTOTAL(2,F15:F23)
				9.0	=COUNT(F15:F23)

On the top right hand side, we have filtered one of the data. The SUBTOTAL function doesn't count those numbers which are filtered out and hence calculates the numbers which are shortlisted unlike count which still is calculating entire contents of the database.

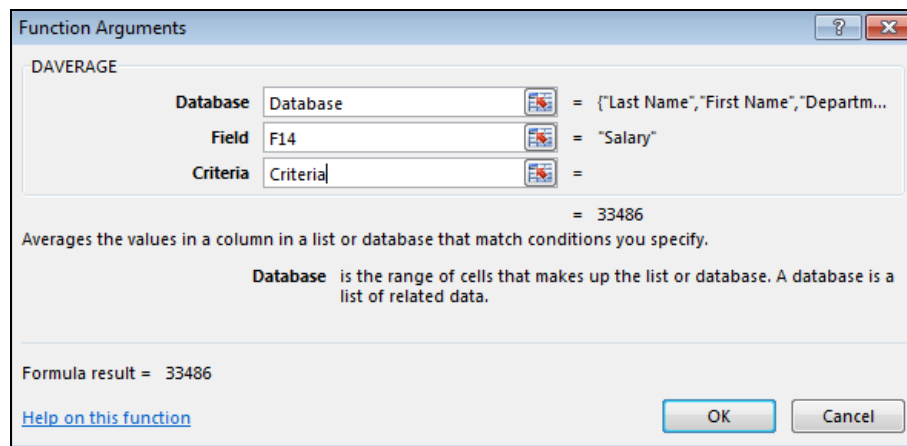
Using the Database Function Formulas:

1. Click on the cell where the answer is to be placed
2. Click on Formulas, select Insert Function. (Keyboard shortcut: **ALT+M+F**).

The following dialog box will appear:



3. Select the Database category.
4. Select the desired function.
5. Click on OK. The following dialog box will appear:



6. Fill in the database, field and criteria ranges. If the database or criteria ranges are named, type the names in the corresponding database and criteria range fields.
7. Click OK to finish.

PivotTables

Purpose: To arrange, organize, find relationships, and explain data in a table that can be altered and manipulated to show various meanings or summaries of the data.

Understanding what a PivotTable can do is equally, if not more, important to knowing how to use it:

- A pivot table creates an interactive summary from many records.
- A pivot table can total/avg/max/min/count/etc. all sorts of data in all sorts of manners.
- You create the pivot table by using a wizard -- no need for complicated formulas!
- You can quickly rearrange the information in the pivot table by dragging the buttons to a new position.

Organizing Data:

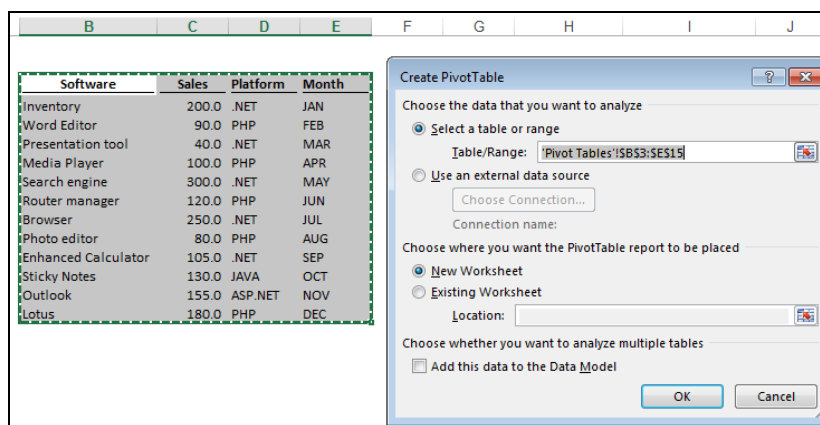
- **Use Headings:** Use a different heading for each column.
- **Keep It Together:** Keep all the data together -- don't include any blank rows or columns in the table.
- **Isolate It:** Leave at least one blank row and one blank column between the data table and any other information on the worksheet.

This is the data table we will be working with.

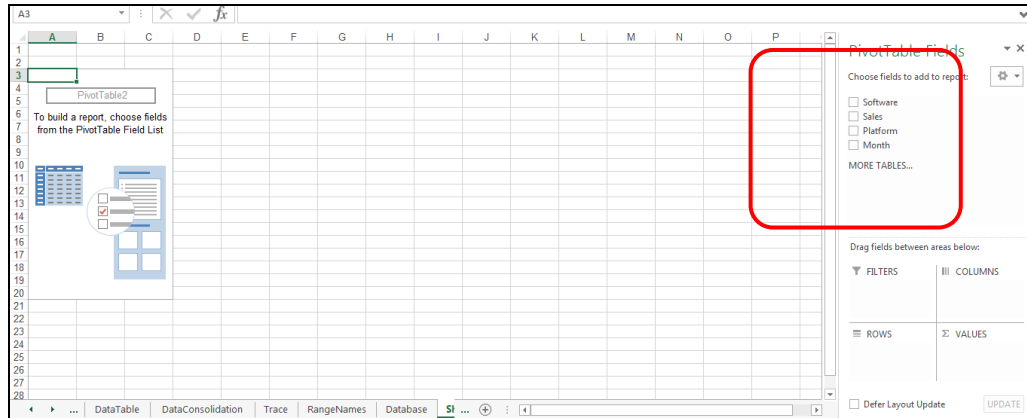
	A	B	C	D	E
1					
2					
3		Software	Sales	Platform	Month
4		Inventory	200.0	.NET	JAN
5		Word Editor	90.0	PHP	FEB
6		Presentation tool	40.0	.NET	MAR
7		Media Player	100.0	PHP	APR
8		Search engine	300.0	.NET	MAY
9		Router manager	120.0	PHP	JUN
10		Browser	250.0	.NET	JUL
11		Photo editor	80.0	PHP	AUG
12		Enhanced Calculator	105.0	.NET	SEP
13		Sticky Notes	130.0	JAVA	OCT
14		Outlook	155.0	ASP.NET	NOV
15		Lotus	180.0	PHP	DEC
16					
17					

Creating a PivotTable:

1. Make sure that all rows and columns are selected and record (row) must not be obscure or elusive and must be making sense. Click on the Insert tab, and then PivotTable.

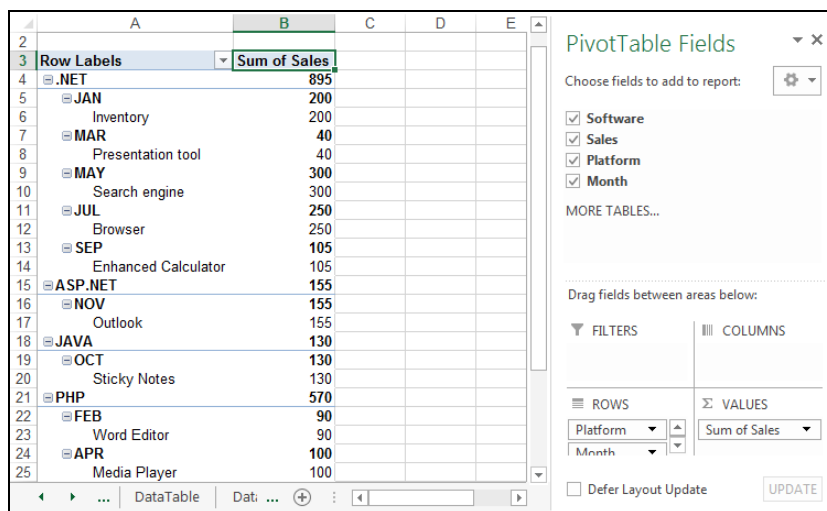


2. Click Ok; your window will look like this now.



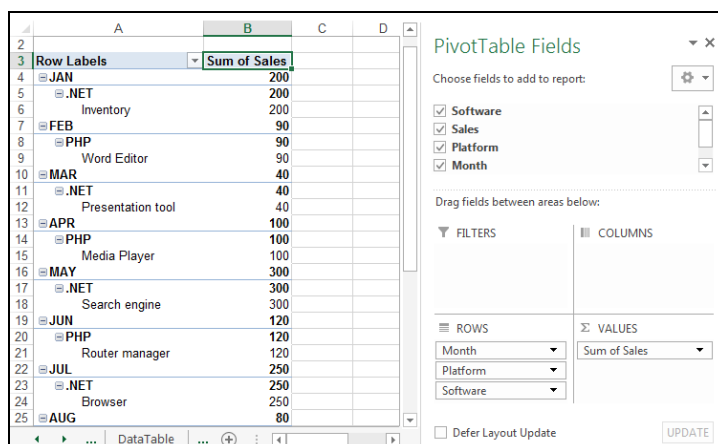
Pivot table will appear. Now we will populate this table with data fields which is present at the right side of the Excel window. Just enable the field's checkboxes seen at the right side of the window and Excel will automatically start populating pivot table report.

We start off with enabling Platform field, and then other fields. Excel starts filling cells in the sequence you want to populate. The Platform field will come first in the Pivot Table as shown in screen shot.

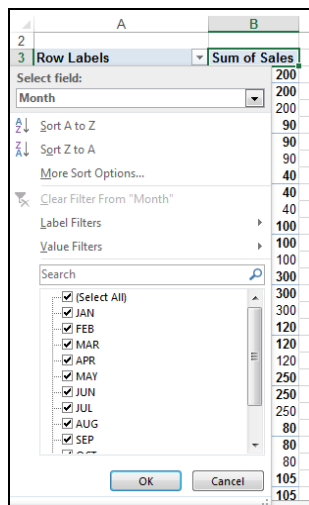


If you want to populate in a different way, just change the sequence.

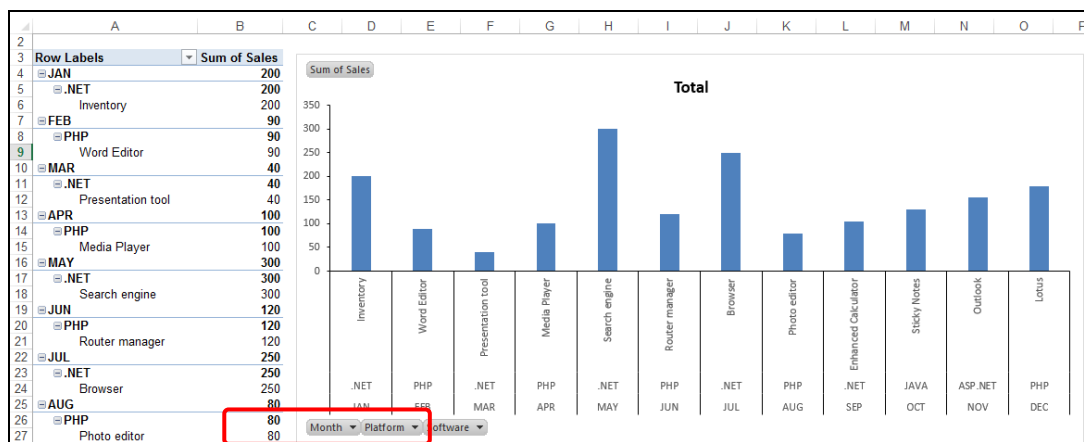
For Instance: In order to summarize data by showing Month field first and then other fields. Enable Month field first and then other fields.



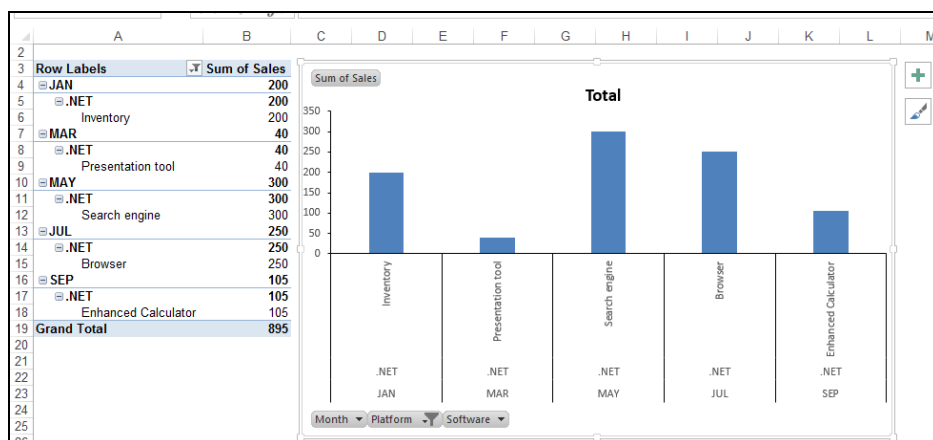
For more filtering options, click on Row Labels drop-down button, you will see different options available to filter down and summarize it in a better way.



To create a chart of a pivot table, go to Insert tab, click Column select an appropriate chart type. In this example we will create a simple 3-D Column chart.



Excel will create chart out of your data. Now resize it for a better view. Chart content can be changed by using the options at the bottom-left of its area.



Pivot Table and Chart will only show software and month in which .NET platform is used for development.

Shortcut Keys

Enter Data

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Repeat the last action	F4 or CTRL+Y	F4 or CTRL+Y	F4 or CTRL+Y
Start a new line in the same cell	ALT+ENTER	ALT+ENTER	ALT+ENTER
Go to	CTRL+G or F5	CTRL+G or F5	CTRL+G or F5
To replace	CTRL+H or ALT+E+E	ALT+H+F+D+R	CTRL+H or ALT+E+E
Insert a tab character in a cell	CTRL+ALT+TAB	CTRL+ALT+TAB	CTRL+ALT+TAB
Delete the character to the left of the insertion point, or delete the selection	BACKSPACE	BACKSPACE	BACKSPACE
Delete the character to the right of the insertion point, or delete the selection	DELETE	DELETE	DELETE
Delete text to the end of the line	CTRL+DELETE	CTRL+DELETE	CTRL+DELETE
Move one character up, down, left, or right	Arrow Keys	Arrow Keys	Arrow Keys
Move to the beginning of the line	HOME	HOME	HOME
Insert/Edit a cell note	SHIFT+F2	SHIFT+F2	SHIFT+F2
Create names from cell text	CTRL+SHIFT+F3	ALT+M+C	CTRL+SHIFT+F3
To fit the column width	ALT+H+O+I	ALT+H+O+I	ALT+H+O+I
To change the sheet name	ALT+O+H+R	ALT+H+O+R	ALT+O+H+R
Fill down	CTRL+D	CTRL+D	CTRL+D
Fill to the right	CTRL+R	CTRL+R	CTRL+R
Fill the selected cell range with the current entry	CTRL+ENTER	CTRL+ENTER	CTRL+ENTER
Complete a cell entry and move down in the selection	ENTER	ENTER	ENTER
Complete a cell entry and move up in the selection	SHIFT+ENTER	SHIFT+ENTER	SHIFT+ENTER
Complete a cell entry and move to the right in the selection	TAB	TAB	TAB
Complete a cell entry and move to the left in the selection	SHIFT+TAB	SHIFT+TAB	SHIFT+TAB
Cancel a cell entry	ESC	ESC	ESC
Close window	CTRL+W or ALT+F4 or ALT+F+C	CTRL+W or ALT+F4 or ALT+F+C	CTRL+W or ALT+F4 or ALT+F+C
Inserting header & footer	ALT+N+H	ALT+N+H	ALT+N+H

Shortcut Keys (contd.)

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Start a formula	EQUAL SIGN	EQUAL SIGN	EQUAL SIGN
Activate a cell and the formula bar	F2	F2	F2
Activate and clear the formula bar when a cell is selected, or delete the preceding character in the formula bar	BACKSPACE	BACKSPACE	BACKSPACE
Paste a name into a formula	F3	F3	F3
Define a name	ALT+M+M+D	ALT+M+M+D	ALT+M+M+D
Calculate all sheets in all open workbooks	F9 or CTRL+EQUAL SIGN	F9 or CTRL+EQUAL SIGN	F9 or CTRL+EQUAL SIGN
Calculate the active sheet	SHIFT+F9	SHIFT+F9	SHIFT+F9
Insert the AutoSum formula	ALT+EQUAL SIGN	ALT+EQUAL SIGN	ALT+EQUAL SIGN
Enter the date	CTRL+;(semicolon)	CTRL+;(semicolon)	CTRL+;(semicolon)
Enter the time	CTRL+SHIFT+:(colon)	CTRL+SHIFT+:(colon)	CTRL+SHIFT+:(colon)
Copy the value from the cell above the active cell into the cell or the formula bar	CTRL+SHIFT+”	CTRL+SHIFT+”	CTRL+SHIFT+”
Alternate between displaying cell values and displaying cell formulas	CTRL+` (single left quotation mark)	CTRL+` (single left quotation mark)	CTRL+` (single left quotation mark)
Copy a formula from the cell above the active cell into the cell or the formula bar	CTRL+’ (apostrophe)	CTRL+’ (apostrophe)	CTRL+’ (apostrophe)
Enter a formula as an array formula	CTRL+SHIFT+ENTER	CTRL+SHIFT+ENTER	CTRL+SHIFT+ENTER
Display step 2 of the Function Wizard, after you type a valid function name in a formula	CTRL+A	CTRL+A	CTRL+A
Insert the argument names and parentheses for a function, after you type a valid function name in a formula	CTRL+SHIFT+A	CTRL+SHIFT+A	CTRL+SHIFT+A
Activate the AutoComplete list	ALT+Down Arrow	ALT+Down Arrow	ALT+Down Arrow
To trace immediate dependents	ALT+M+D	ALT+M+D	ALT+T+U+D
To trace immediate precedents	ALT+M+P	ALT+M+P	ALT+T+U+T
To remove tracing arrows	ALT+M+M+A	ALT+M+A+A	ALT+T+U+A
Show formulas or values	CTRL+~	CTRL+~	CTRL+~

Format Data

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Carry out the Style command (Format menu)	ALT+'(apostrophe)	ALT+'(apostrophe)	ALT+'(apostrophe)
Carry out the Cells command (Format Menu)	CTRL+I	CTRL+I	CTRL+I
Apply the General number format	CTRL+SHIFT+~	CTRL+SHIFT+~	CTRL+SHIFT+~
Apply the Currency Format with two decimal places (negative numbers appear in red and in parentheses)	CTRL+SHIFT+\$	CTRL+SHIFT+\$	CTRL+SHIFT+\$
Apply the Percentage format with no decimal places	CTRL+SHIFT+%	CTRL+SHIFT+%	CTRL+SHIFT+%
Apply the Exponential number format with two decimal places	CTRL+SHIFT+^	CTRL+SHIFT+^	CTRL+SHIFT+^
Apply the Date format with day, month, and year	CTRL+SHIFT+#	CTRL+SHIFT+#	CTRL+SHIFT+#
Apply the Time format with the hour and minute, and indicate A.M. or P.M.	CTRL+SHIFT+@	CTRL+SHIFT+@	CTRL+SHIFT+@
Apply the two-decimal-place format with commas	CTRL+SHIFT+!	CTRL+SHIFT+!	CTRL+SHIFT+!
Apply the outline border	CTRL+SHIFT+&	CTRL+SHIFT+&	CTRL+SHIFT+&
Remove all borders	CTRL+SHIFT+_	CTRL+SHIFT+_	CTRL+SHIFT+_
Apply or remove bold formatting	CTRL+B	CTRL+B	CTRL+B
Apply or remove italic formatting	CTRL+I	CTRL+I	CTRL+I
Apply or remove an underline	CTRL+U	CTRL+U	CTRL+U
Apply or remove strikethrough formatting	CTRL+5	CTRL+5	CTRL+5
Hide Rows	CTRL+9	CTRL+9	CTRL+9
Unhide Rows	CTRL+SHIFT+(CTRL+SHIFT+(CTRL+SHIFT+(
Hide Columns	CTRL+0	CTRL+0	CTRL+0
Unhide Columns	CTRL+SHIFT+)	CTRL+SHIFT+)	CTRL+SHIFT+)
Format Cells	ALT+O+E/CTRL+1	ALT+H+O+E	ALT+O+E/CTRL+1

Shortcut keys (contd.)

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Adjusting row height	ALT+H+O+H	ALT+H+O+H	ALT+O+R+E
Autofit row height	ALT+H+O+A	ALT+H+O+A	ALT+O+R+A
Hide row/Unhide row	ALT+H+O+U+R ALT+H+O+U+O	ALT+H+O+U+R ALT+H+O+U+O	ALT+O+R+H/ ALT+O+R+U
Adjusting column width	ALT+H+O+W	ALT+H+O+W	ALT+O+C+W
Autofit column width	ALT+H+O+I	ALT+H+O+I	ALT+O+C+A
Hide column/Unhide column	ALT+H+O+U+C/ ALT+H+O+U+L	ALT+H+O+U+C/ ALT+H+O+U+L	ALT+O+C+H/ ALT+O+C+U
Rename sheet	ALT+H+O+R	ALT+H+O+R	ALT+O+H+R
Hide sheet/Unhide sheet	ALT+H+O+U+S/ALT+H+O+U+ H	ALT+H+O+U+S/ALT+H+O+U +H	ALT+O+H+H/ALT+O+H+U
Change tab color	ALT+H+O+T	ALT+H+O+T	ALT+O+H+T
Group rows/columns	ALT+A+G+G	ALT+A+G+G	SHIFT+ALT+RIGHT ARROW/ ALT+D+G+G
Ungroup rows/columns	SHIFT+ALT+LEFT ARROW	SHIFT+ALT+LEFT ARROW	SHIFT+ALT+LEFT ARROW

Format Data

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Extend the selection by one cell	SHIFT+ARROW KEY	SHIFT+ARROW KEY	SHIFT+ARROW KEY
Extend the selection to the edge of the current data region	CTRL+SHIFT+ARROW KEY	CTRL+SHIFT+ ARROW KEY	CTRL+SHIFT+ ARROW KEY
Extend the selection to the beginning of the worksheet	SHIFT+HOME	SHIFT+HOME	SHIFT+HOME
Extend the selection to the last cell in the worksheet (lower-right corner)	CTRL+SHIFT+HOME	CTRL+SHIFT+HOME	CTRL+SHIFT+HOME
Select from selected cell to end of data set	CTRL+SHIFT+END	CTRL+SHIFT+END	CTRL+SHIFT+END
Select the entire column	CTRL+SPACEBAR	CTRL+SPACEBAR	CTRL+SPACEBAR
Select the entire row	SHIFT+SPACEBAR	SHIFT+SPACEBAR	SHIFT+SPACEBAR
Select the entire worksheet	CTRL+A	CTRL+A	CTRL+A
Collapse the selection to the active cell	SHIFT+BACKSPACE	SHIFT+BACKSPACE	SHIFT+BACKSPACE
Extend the selection down one screen	SHIFT+PAGE DOWN	SHIFT+PAGE DOWN	SHIFT+PAGE DOWN
Extend the selection up one screen	SHIFT+PAGE UP	SHIFT+PAGE UP	SHIFT+PAGE UP
Select the current region	CTRL+SHIFT+*	CTRL+SHIFT+*	CTRL+SHIFT+*
With an object selected, select all objects on a sheet	CTRL+SHIFT+SPACEBAR	CTRL+SHIFT+SPACEBAR	CTRL+SHIFT+SPACEBAR

Alternate between hiding objects, displaying objects, and displaying placeholders for objects	CTRL+6	CTRL+6	CTRL+6
Show or hide the Standard toolbar	CTRL+7		
Turn End mode on or off	END	END	END
Extend the selection to the end of the data block in the direction of the arrow	END, SHIFT+ARROW key	END, SHIFT+ARROW key	END, SHIFT+ARROW key
Extend the selection to the last cell in the worksheet (lower right corner)	END, SHIFT+HOME	END, SHIFT+HOME	END, SHIFT+HOME
Extend the selection to the last cell in the current row (unavailable if you've selected the Transition Navigation Keys check box)	END, SHIFT+ENTER	END, SHIFT+ENTER	END, SHIFT+ENTER

Select Cells with Special Characteristics

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Select all cells that contain a note	CTRL+SHIFT+?	CTRL+SHIFT+?	CTRL+SHIFT+?
Select a range around the active cell (the selected range is an area enclosed by blank rows and blank columns)	CTRL+SHIFT+*	CTRL+SHIFT+*	CTRL+SHIFT+*
Select the entire array that the active cell belongs to	CTRL+/ CTRL+\	CTRL+/ CTRL+\	CTRL+/ CTRL+\
Select cells whose contents are different from the comparison cell in each row (for each row, the comparison cell is in the same column as the active cell)	CTRL+SHIFT+I	CTRL+SHIFT+I	CTRL+SHIFT+I
Select cells whose contents are different from the comparison cell in each column (for each column, the comparison cell is in the same row as the active cell)	CTRL+SHIFT+I	CTRL+SHIFT+I	CTRL+SHIFT+I
Select only cells that are directly referred to by formulas in the selection	CTRL+[CTRL+[CTRL+[
Select all cells that are directly or indirectly referred to by formulas in the selection	CTRL+SHIFT+[CTRL+SHIFT+[CTRL+SHIFT+[
Select only cells that with formulas that refer directly to the active cell	CTRL+]	CTRL+]	CTRL+]
Select all cells with formulas that refer directly or indirectly to the active cell	CTRL+SHIFT+]	CTRL+SHIFT+]	CTRL+SHIFT+]
Go back to the original cell	F5 + Enter	F5 + Enter	F5 + Enter
Select only visible cells in the current selection	ALT+SEMICOLON	ALT+SEMICOLON	ALT+SEMICOLON

Select Chart Items in an Activated Chart

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Select the previous group of items	DOWN ARROW	DOWN ARROW	DOWN ARROW
Select the next group of items	UP ARROW	UP ARROW	UP ARROW
Select the next item within the group	RIGHT ARROW	RIGHT ARROW	RIGHT ARROW
Select the previous item within the group	LEFT ARROW	LEFT ARROW	LEFT ARROW

Move Within a Selection

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Move from top to bottom within the selection, or move to the right one cell if only one row is selected.	ENTER	ENTER	ENTER
Move from bottom to top within the selection, or move to the left one cell if only one row is selected	SHIFT+ENTER	SHIFT+ENTER	SHIFT+ENTER
Move from left to right within selection	TAB	TAB	TAB
Move from right to left within selection	SHIFT+TAB	SHIFT+TAB	SHIFT+TAB
Move clockwise to the next corner of the selection	CTRL+PERIOD	CTRL+PERIOD	CTRL+PERIOD

Insert, Delete and Copy a Selection

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Copy the selection	CTRL+C	CTRL+C	CTRL+C
Paste the selection	CTRL+V	CTRL+V	CTRL+V
Paste Special Box	ALT+E+S	ALT+H+V+S	ALT+E+S
Paste Format Only	ALT+E+S+T	ALT+H+V+R	ALT+E+S+T
To Move or Copy a Sheet	ALT+E+M	ALT+H+O+M	ALT+E+M
To delete a worksheet	ALT+E+L	ALT+H+D+S	ALT+E+L
Cut the selection	CTRL+X	CTRL+X	CTRL+X
Clear the selection of formulas and data	DELETE	DELETE	DELETE
Insert blank cells	CTRL+SHIFT+PLUS SIGN	CTRL+SHIFT+PLUS SIGN	CTRL+SHIFT+PLUS SIGN
Insert Cells	ALT+I+E	ALT+H+I+I	ALT+I+E
Insert Rows	ALT+I+R	ALT+H+I+R	ALT+I+R
Insert Worksheet	ALT+I+W	ALT+H+I+S	ALT+H+I+S
Delete the selection (Rows/Columns/Cells)	CTRL+MINUS SIGN	CTRL+MINUS SIGN	CTRL+MINUS SIGN
Undo the last action	CTRL+Z	CTRL+Z	CTRL+Z

Move in Workbooks and Worksheets

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Move one cell in a given direction	Arrow Key	Arrow Key	Arrow Key
Move to the edge of the current data region	CTRL+Arrow Key	CTRL+Arrow Key	CTRL+Arrow Key
Move between unlocked cells in a protected worksheet	TAB	TAB	TAB
Move to the beginning of the row	HOME	HOME	HOME
Move to the beginning of the worksheet	CTRL+HOME	CTRL+HOME	CTRL+HOME
Move to the last cell in the worksheet (in the lower-right corner)	CTRL+END	CTRL+END	CTRL+END
Move one screen down	PAGE DOWN	PAGE DOWN	PAGE DOWN
Move one screen up	PAGE UP	PAGE UP	PAGE UP
Move one screen to the right	ALT+PAGE DOWN	ALT+PAGE DOWN	ALT+PAGE DOWN
Move one screen to the left	ALT+PAGE UP	ALT+PAGE UP	ALT+PAGE UP
Move to the next workbook	CTRL+F6 (ALT+TAB)	CTRL+F6 (ALT+TAB)	CTRL+F6 (ALT+TAB)
Move to the previous workbook	CTRL+SHIFT+F6	CTRL+SHIFT+F6	CTRL+SHIFT+F6
To split panes and remove split panes	ALT+W+S	ALT+W+S	ALT+W+S
To freeze window and unfreeze window	ALT+W+F+F	ALT+W+F+F	ALT+W+F+F
To freeze top row	ALT+W+F+R	ALT+W+F+R	-
To freeze first row	ALT+W+F+C	ALT+W+F+C	-
Move to the next pane (when Window is Split)	F6	F6	F6
Move to the previous pane (when Window is Split)	SHIFT+F6	SHIFT+F6	SHIFT+F6

Scroll in a Workbook Window

Function	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Move one screen up or down	PAGE UP or PAGE DOWN	PAGE UP or PAGE DOWN	PAGE UP or PAGE DOWN
Move one screen to the right	ALT+PAGE DOWN	ALT+PAGE DOWN	ALT+PAGE DOWN
Move one screen to the left	ALT+PAGE UP	ALT+PAGE UP	ALT+PAGE UP
Move to the previous sheet in the workbook	CTRL+PAGE UP	CTRL+PAGE UP	CTRL+PAGE UP
Move to the next sheet in the workbook	CTRL+PAGE DOWN	CTRL+PAGE DOWN	CTRL+PAGE DOWN
Display the next window	CTRL+F6 or CTRL+TAB	CTRL+F6 or CTRL+TAB	CTRL+F6 or CTRL+TAB
Display the previous window	CTRL+SHIFT+F6 or CTRL+SHIFT+TAB	CTRL+SHIFT+F6 or CTRL+SHIFT+TAB	CTRL+SHIFT+F6 or CTRL+SHIFT+TAB
Scroll to display the active cell	CTRL+BACKSPACE	CTRL+BACKSPACE	CTRL+BACKSPACE
Turn scroll lock on or off	SCROLL LOCK	SCROLL LOCK	SCROLL LOCK
Scroll one row up or down	UP ARROW or DOWN ARROW (with Scroll Lock turned on)	UP ARROW or DOWN ARROW (with Scroll Lock	UP ARROW or DOWN ARROW (with Scroll Lock turned on)

Scroll one column left or right	LEFT ARROW or RIGHT ARROW (with Scroll Lock turned on)	turned on) LEFT ARROW or RIGHT ARROW (with Scroll Lock turned on)	LEFT ARROW or RIGHT ARROW (with Scroll Lock turned on)
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Print and Preview a Document

Command	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Print command (File menu)	CTRL+P	CTRL+P	CTRL+P
To check the print preview	ALT+F+V	ALT+F+V or CTRL+F2	ALT+F+V
Functions in Print Preview	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
To change the view sizing or zoom	ALT+W+Q	ALT+W+Q	ALT+V+Z
Move around the page when zoomed in	Arrow keys	Arrow keys	Arrow keys
Inserting page break	ALT+P+B+I	ALT+P+B+I	
Functions within a Text Box	Excel 2013 Shortcut	Excel 2010 Shortcut	Common Shortcut Keys
Move to the beginning or end of the entry	HOME or END	HOME or END	HOME or END
Move one character to the left or right	LEFT ARROW or RIGHT ARROW	LEFT ARROW or RIGHT ARROW	LEFT ARROW or RIGHT ARROW
Select from the insertion point to the beginning of the entry	SHIFT+HOME	SHIFT+HOME	SHIFT+HOME
Select from the insertion point to the end of the entry	SHIFT+END	SHIFT+END	SHIFT+END
Select the character to the left	SHIFT+LEFT ARROW	SHIFT+LEFT ARROW	SHIFT+LEFT ARROW
Select the character to the right	SHIFT+RIGHT ARROW	SHIFT+RIGHT ARROW	SHIFT+RIGHT ARROW

Function Keys

	Function Key	SHIFT	CTRL	CTRL+SHIFT	ALT+SHIFT
F1	Get help or the Answer Wizard				Insert a new worksheet
F2	Activate a cell and the formula bar	Edit a cell note	Display the Info window		
F3	Paste a name into a formula	Display the function wizard	Define a name	Create names from cell text	
F4	Repeat the last action	Repeat a Find or Go To action	Close the window		
F5	Carry out the Go To command (Edit menu)	Carry out the Find command (Edit menu)	Restore the window size		
F6	Go to the next pane	Go to previous pane	Go to the next workbook	Go to the previous workbook	
F7	Carry out the Spelling command		Carry out the Move Command		
F8	Extend a selection	Turns Add mode on or off	Carry out the Size command		
F9	Calculate all sheets in all open workbooks	Calculate the active sheet	Minimize the workbook		
F10	Activate the menu bar	Display a shortcut menu	Maximize the document window		
F11	Create a chart	New Worksheet			
F12	Carry out Save As command (File menu)	Carry out the Save command (File menu)	Carry out the Open command	Carry out the Print command (File menu)	